The Use Of Consumer Knowledge, Beliefs And Attitudes In The Development Of A Local Authority Strategy For Domestic Food Hygiene Education

Thesis

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THE USE OF CONSUMER KNOWLEDGE, BELIEFS AND ATTITUDES IN THE DEVELOPMENT OF A LOCAL AUTHORITY STRATEGY FOR DOMESTIC FOOD HYGIENE EDUCATION

KATHRYN ANNE MATHIAS

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ABSTRACT

The aim of this investigation was to evaluate knowledge, beliefs and attitudes of domestic food handlers in Port Talbot by means of questionnaires and use the information gained to formulate a local authority health education strategy.

Survey 1 looked at the food hygiene knowledge and practices of 88 residents in such areas as temperature control, cooking and cross contamination. Whilst people had a sound knowledge of how to prepare safe food, there were areas in which knowledge was lacking, e.g. – only 14% thawed meat in the refrigerator and 35% put food in the refrigerator wherever there was space.

Survey 2 looked at the food hygiene beliefs of 109 residents. Handwashing was a common belief with 74% listing it as something they could do to make food safe. However only 14% identified defrosting thoroughly and only 4% listed changing dishcloths regularly.

Survey 3 looked at the attitude of 64 residents to food hygiene. Generally respondents demonstrated a positive attitude with 92% acknowledging that good food hygiene will prevent food poisoning. However 20% did not see the home environment as having the potential to cause food poisoning. There was no significant difference in attitude between male and female, younger and older respondents or those with or without food hygiene training.

The surveys also included questions as to where respondents would go for food hygiene information. One of the areas identified was the mass media. To identify their role in imparting food hygiene information a survey was carried out. Several areas of the mass media were examined including magazines and television cookery programmes. The results indicated the mass media to be an underutilized source of information

The information gained from the surveys was then used to inform a health education strategy for food hygiene that could be used by a local authority.

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ABBREVIATIONS

ACMSF	-	Advisory Committee on the Microbiological Safety of Food
CAC	-	Codex Alimentarius Commission
CDSC	-	Communicable Disease Surveillance Centre
CIEH	-	Chartered Institute of Environmental Health
CoP	-	Code of Practice
DoE	-	Department of Education
DoH	-	Department of Health
EC	-	European Community
FAO	-	Food and Agriculture Organisation
FDA	-	Food and Drugs Administration
FDF	-	Food and Drink Federation
HA	-	Health Authority
HACCP	-	Hazard Analysis Critical Control Point
HBM	-	Heath Belief Model
ICMSF	-	International Commission on Microbiological Specifications for Foods
LA	-	Local Authority
LACOTS	-	Local Authorities Co-ordinating Body on Food and Trading Standards
MAFF	-	Ministry of Agriculture, Fisheries and Food
NACMCF	-	National Advisory Committee on Microbiological Criteria for Foods.
NHS	-	National Health Service
OPCS	-	Office of Population Censuses and Surveys
PHLS	-	Public Health Laboratory Service
WHO	-	World Health Organization

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Chapter 1

Introduction

1. INTRODUCTION

Food is essential to life but if contaminated it can cause food poisoning which may even result in death. Fortunately this happens in only a minority of cases but many cases cause unpleasant and weakening illnesses which consequently are of significant cost to the country.

Food poisoning, which has been defined as an illness of the gastro-intestinal tract caused by the consumption of contaminated food and resulting in such symptoms as nausea, vomiting, abdominal pains and diarrhoea, is an ever growing problem with more and more people suffering its effects each year. The cause almost always involves human error. It does not happen by accident but occurs when people store, handle or prepare food incorrectly.

There is no justification for why this should happen. Food poisoning can be prevented just as easily as it can be caused by taking time and care to follow basic rules of hygiene, and this applies equally to the workplace and to the home.

The numbers of cases of food poisoning has increased dramatically over the last twenty years with approximately 100,000 cases being reported in 1997 in Great Britain. This trend is reflected worldwide and has led to growing concern amongst governments and consumers alike.

Many reasons have been put forward for this increase including the heightened popularity of eating out and poor standards of hygiene in commercial kitchens. Whilst this is starting to be addressed by the implementation of more stringent legislation in commercial premises, there is no control over poor hygiene in domestic kitchens.

There is general agreement that one of the main strategies for preventing food poisoning lies in better education and the adoption of good hygiene practices in the

kitchen; however this involves behavioural change and is easier to say than to achieve. This thesis aims to examine various aspects of the consumers' knowledge and food hygiene practices, by the use of surveys, which will aim to identify:

- The food hygiene knowledge of the domestic food handler
- Where domestic food handlers obtain their food hygiene information and where they feel they would like to obtain that information
- The role of the mass media in disseminating food hygiene information to the general public
- The food hygiene beliefs of the residents of Port Talbot i.e. what they feel they can do to make the food they prepare safe to eat
- The attitude of the residents of the borough to food hygiene

To undertake these surveys various questionnaires were designed which could determine the publics knowledge, beliefs and attitude to food hygiene. From the information so obtained a strategy was designed for implementation by the local authority which would be both efficient and cost effective in attempting to change peoples behaviour, thus improving their domestic food hygiene practices and thereby decreasing the number of reported cases of food poisoning.

Chapter 2

Literature Review

2. LITERATURE REVIEW

2.1. Introduction

This chapter surveys relevant literature on food poisoning and provides an introduction into the research undertaken in the field of domestic food hygiene. These have informed the present study, the overall aim of which is to develop an efficient and cost-effective strategy for the promotion of food safety, which could be used by local authorities (LAs).

2.2. Background

Everyone must eat to survive and food safety is of paramount importance to consumers (Saunders 1991). We eat to live and as a social pleasure. It is a basic human right that the food we eat does us no harm nor is the cause of our early demise. This is not always the case and there can be an element of risk associated with eating (Saunders 1991).

Food poisoning is at least unpleasant and at worst a sometimes fatal illness which may follow the consumption of contaminated or poisonous foods (Donaldson 1988). The common perception of the symptoms of food poisoning are those associated with gastro-enteritis however symptoms can vary widely, from confusion and paralysis due to central nervous system involvement, to renal and hepatic failure. Though, these are usually from the less common causes of food poisoning (Department of Health and Social Services 1988, Scottish Home and Health Department 1991, Public Health Laboratory Service (PHLS) 1990), food poisoning has been increasing steadily over the past twenty years with 94,382 cases being reported in 1997 in England and Wales, and is therefore of growing concern to government, industry and the public at large (Office of Population and Census Survey (OPCS) 1998).

2.3. Introduction to Food Poisoning and Food Safety

2.3.1. Explanation of Terms

Sprenger defined food poisoning as "an acute illness, usually of sudden onset, brought about by eating contaminated or poisonous food" (Sprenger 1997 p9), and whilst this is an acceptable definition it does not necessarily include other illnesses which may be food-borne. Confusion surrounds the terms food poisoning and food-borne illness. Historically food-borne illness and food poisoning have differed in that:

- the incubation period for food-borne illness is normally longer
- the minimum infective dose is much smaller
- the food acts purely as a vehicle and the multiplication of the organism within the food is not an important feature of the illness
- infection may also be spread by non-food items
- the infective organism enters the blood stream and symptoms may or may not include diarrhoea and vomiting (Sprenger 1997 p48)

Traditionally food poisoning would therefore include *Salmonella spp, Clostridium spp, Staphylococcus aureus, Bacillus spp and Streptococcus spp,* whereas food-borne illness would include typhoid, paratyphoid, dysentery, *Campylobacter spp,* listeriosis, hepatitis, brucellosis, tuberculosis, vero cytotoxin producing *E.coli (VTEC)* giardiasis and cryptosporidiosis (Brownsell et al 1989). The Communicable Disease Surveillance Centre (CDSC) and the Public Health Laboratory Service (PHLS) previously restricted the use of the term food poisoning to illness caused by *Clostridium, Staphylococcus aureus* and *Bacillus species* (PHLS - CDSC 1993). They used the term "food-borne illness" to include infections or intoxifications associated with bacteria other than those listed above. *Salmonella* and *Campylobacter* are therefore regarded as food-borne illnesses, as are illnesses caused

by *Scrombotoxin, Ciguatera,* and typhoid. This confusion led to the Richmond Committee recommending a review of the definition, which in turn led to the Advisory Committee on the Micro-biological Safety of Food (ACMSF) defining food poisoning in 1992 as "any disease of an infectious or toxic nature caused by or thought to be caused by the consumption of food or water". This definition by its very nature would therefore include what was previously referred to as food borne illness. The same definition has been adopted by the World Health Organization (WHO) and has also been in use in Scotland since 1980. This definition:

- includes all food or water borne illness regardless of the presenting symptoms and signs; thus it includes not only acute illnesses characterised by diarrhoea and/or vomiting but also illnesses presenting with manifestations not related to the gastrointestinal tract
- includes illness caused by toxic chemicals irrespective of origin whether these are naturally occurring inorganic compounds or of biological or man-made origin
- excludes illness due to known allergies and food intolerance

For the purposes of this study the definition recommended by the ACMSF will apply and the term food poisoning used to encompass all such illnesses.

However exceptions may be made when quoting the work of other authors.

2.3.2. Causes of Food Poisoning

Food Poisoning may be caused by the ingestion of food contaminated by:

a) bacteria or their toxins

b) chemicals

c) metals

d) poisonous plants or fish

e) viruses

f) mycotoxins

(Sprenger 1997, p9)

Other gastro-intestinal infections acquired by mouth are due generally to direct ingestion of micro-organisms without the intervention of food as a vehicle of transmission.

The mode of transmission of such infections is by the faecal-oral route and includes such illnesses as poliomyelitis. The distinction is not absolute. Some conditions, e.g. dysentery, though normally spread by the faecal-oral route may be transmitted in food (Cruickshank 1992).

The majority of cases of food poisoning have however been found to have a microbiological origin and generally thorough cooking of the food will destroy any harmful bacteria, other than toxins and spores. However if foods containing bacteria are inadequately cooked or once cooked are re-contaminated through poor hygiene, food poisoning may result. This includes foods contaminated at source and not subjected to any heat treatment such as cooking.

Work in this thesis has concentrated on bacterial food poisoning, which covers all such illnesses as opposed to specified bacterial illnesses and, as stated, will use the term "food poisoning", which encompasses all illnesses that may be transmitted by food or water.

2.3.3. Bacterial Food Poisoning

Bacteria are present everywhere in everyday life. They are microscopic, typically 0.8 – 10 micrometers in size. Not all are harmful, in fact some are essential such as those introduced into the manufacture of cheese and yogurts. However some can cause problems to the food industry such as those that cause spoilage of food and an even

smaller number known as pathogenic bacteria which are responsible for causing illness (Chartered Institute of Environmental Health (CIEH) 1998).

Bacterial food poisoning has been defined as "an acute disturbance of the intestinal tract resulting in abdominal pain, with or without diarrhoea and vomiting, due to eating food contaminated by pathogenic bacteria or their toxins" (Sprenger 1997 p9). The incubation period is normally between 1 and 72 hours. The number of bacteria needed to be ingested to cause illness in a healthy adult is usually large and multiplication of the bacteria normally occurs in the food, though it can occur in the intestines.

Recovery is within a few days although the illness can be prolonged and lead to complications in vulnerable groups (Sprenger 1997).

Although many cases result in temporary, relatively minor problems there is growing evidence that intestinal infections can result in permanent consequences such as arthritis or allergic reaction (Farber 1989, Bishai and Sears 1993, Lacey 1993, Sharp and Reilly 1994, Farber and Hughes 1995). Fortunately this only occurs in some 2-3% of cases (Sharp and Reilly 1994). Mossel in 1989 observed complications, which included Reiters Disease, pneumonia and colitis after bacterial and parasitic infections, transmitted by food.

Therefore a reduction in cases may have more important consequences than can first be demonstrated by current medical knowledge (Gray and Mossel 1992).

2.3.4. The Importance of Food Poisoning

Food poisoning continues to be an increasing problem, even in developed countries, despite advances in food handling and sanitation practices. Surveillance reports on food poisoning in England and Wales have been published by the PHLS since 1950.

The CDSC provides a regular Communicable Disease Report (CDR) and annual statistics and trends.

Many cases, however, never come to the attention of environmental health departments and the PHLS for a variety of reasons. Only when symptoms are severe, or an outbreak occurs among a well-defined group such as a wedding party, are incidents likely to be reported and investigations undertaken (Acharade and McCover 1993).

Laboratory reports collated by CDSC represent only a proportion of the true prevalence of gastrointestinal pathogens and toxins (Wall et al 1996). Similarly suspected cases may be reported and recorded but not confirmed positive.

This gives a false picture of the true extent of the problem (Aston and Tiffney 1993).

In 1990 alone it was estimated that food poisoning caused the loss of 8 million working days and food scares cost the UK food industry more than £350 million annually through plant closures and £250 million in lost sales. (Aston and Tiffney 1993).

2.3.5. The Incidence of Food Poisoning

Although the true number of cases of food poisoning may not be known, statistics do indicate general trends, different bacteria responsible, situations where outbreaks most often occur and foods most frequently responsible, and are valuable in informing health promotion strategies.

A recent Intestinal Infectious Disease study aimed at discovering the relationship between actual and reported cases assessed the average multiplier to be 1:30. (Unpublished, personal communication). The Table below shows the number of cases of food poisoning reported in England and Wales from 1980 – 1997:

Table 2.1. Cases of Food Poisoning Reported in England and Wales 1980 – 1997

Year	Number of Cases
1980	10318
1981	9936
1982	14253
1983	17735
1984	20702
1985	19242
1986	23948
1987	29331
1988	39713
1989	52492
1990	52145
1991	52542
1992	63347
1993	68490
1994	82591
1995	83490
1996	84423
1997	94382

(OPCS - Communicable Disease Statistics 1998)

The number of cases has more than doubled in the past 5 years due primarily to better reporting, and if this is the tip of the iceberg, figures could be much larger (Wall et al 1996). Cases occur singly (sporadic cases) or in outbreaks where two or more cases are epidemiologically related. Tracing the origin of sporadic cases is often difficult, but where large numbers are involved, common factors usually lead to a source for the offending organism (Cruikshank 1992).

In statistics reported by OPCS certain illnesses e.g. typhoid, dysentery and other notifiable diseases are reported separately to food poisoning.

These statistics are not intended to be an accurate source of cases, only to facilitate the rapid identification and investigation of cases by environmental health officers (EHOs) and if necessary close implicated food premises as quickly as possible.

2.3.6. Reasons for the Increase in Food Poisoning

The increase in the number of cases of food poisoning is of concern to EHOs who, in their day to day work, attempt to discover the source and prevent its spread.

Many theories are been put forward as to why there is an increase (Aston and Tiffney 1993, Lacey 1993). These include:

- changing patterns of food consumption
- improper use of the microwave with food being incorrectly stored and only warmed when required (Worsfold 1994)
- more varied cuisine with more foods being imported including exotic varieties with which the general public are not always conversant as to how to store, prepare and cook (Worsfold 1994)
- alterations to shopping and cooking practices, as more people now work full time; food being bought and prepared well in advance of use
- additional space being needed in the domestic kitchen for storage of foods bought or prepared in advance and a substantial increase in the number of foods requiring refrigeration. However the size of domestic refrigerators and freezers has not increased correspondingly
- a distrust in the use of preservatives resulting in a decrease in their use in perishable commodities at a time when the commodity is expected to last longer (Maurice 1994)
- more people now eat out in a greater variety of outlets, plus an increase in snacking and in the consumption of fast food

- trade in raw materials and processed food has increased and the food chain from farmer to consumer has lengthened and become more complex (Gray and Mossel 1992)
- improved technology in the production, manufacture and distribution of food has led to considerable improvements in hygiene, but at the same time this increase opens the possibility of larger and more widespread incidents (Gray and Mossel.1992)

This increase is worrying especially when one realizes food poisoning causes upwards of 40 deaths per year (Ministry for Agriculture, Fisheries and Food (MAFF) 1995), one only has to consider the outbreak of *E.coli 0157* in Scotland in 1996/97 to appreciate the severity (Pennington Report 1997).

Another theory for this increase is that people are now more aware of food poisoning and contact the professional if they develop symptoms. There has also been an improvement in laboratory testing, making the isolation of the source more reliable. Another reason for the increase may be the use of intense farming methods and the change in animal feeding techniques. The concentrated feeds fed to animals may be contaminated with pathogens and because animal housing is so crowded the bacteria easily spreads (Beddows 1983). This also ties in with the increased consumption of poultry.

In addition there is an increasing number of immuno-compromised consumers in the community. People live longer, therefore the number of over 65s has increased. New diseases, more organ transplants and cancer patients have also led to an increase in the number of "at risk" groups who are more susceptible to pathogenic bacteria in food (Beddows 1983).

2.3.7. Costs of Food Poisoning

For most people food poisoning is merely an inconvenience, with a few days off work/school with vomiting and/or diarrhoea. However it has been noted that minor cases may lead to more serious illnesses.

An estimated 2-3% develop chronic problems and long lasting infections (Todd 1989) although the relative risk seems to be higher in certain tissue types (Griffith, Mullan and Price 1995). The increasing recognition of these consequences has prompted a re-evaluation of the true costs of food poisoning (Wheelock 1988, Todd 1989, Sockett 1994-1995). The costs involved include social and economic and involve the following:

Table 2.2. Costs of Food Poisoning

	COSTS
Individuals	Medical Income Productivity Pain Suffering Leisure time loss Child care Travel
Industry	Product Recall Plant closure Cleaning Product liability Reduced demand Administration
Public Health Surveillance	Disease surveillance Investigating outbreak Cleanup

Several of the above are difficult to quantify e.g. pain and suffering and as a result are often omitted from estimates. Efforts to quantify others have however been made Hartunian et al (1981) included legal expenses and insurance administration, as well as home modifications to accommodate the reduced mobility of the sick person.

Various methods have been suggested for evaluating costs. The "cost of illness" approach is one method based on estimating what resources society would save by avoiding the food poisoning. The backbone of these being medical costs and productivity losses (Roberts and Foegeding 1991).

2.3.8. Economic Costs

Existing information of the economic costs of food poisoning comes from case studies of outbreaks. These take the form of either an assessment of the economic impact of sporadic cases or a specific outbreak, or a cost-benefit analysis of the returns to intervention or the potential returns to preventative activity (Sockett 1993). A third approach (Todd 1989) is to review the costs resulting from outbreaks associated with specific foods e.g. poultry. These studies provide a range of approximate costs. In addition local authority costs of investigating an outbreak can be substantial.

In 1997 a case of indigenous typhoid occurred in Port Talbot. A full investigation ensued lasting 2 months. At the conclusion no further cases were identified and the authority's cost was £11,000 (Neath Port Talbot County Borough Council - 1997). Few detailed estimates of costs are available. Studies (Hartunian et al 1981, Todd 1989, Sockett 1993) have suggested annual costs in excess of ten million dollars for human infection with further costs to agriculture from illness in animals. Substantial costs may also be incurred by the food industry when illness is associated with a particular food or product.

A detailed survey of cases of salmonellosis in England and Wales in 1988/89 identified the main areas of cost as:

- Public sector costs, including treatment-related costs, investigation costs and follow-up of infected individuals; these represented the costs to the public purse.

- Expenditure related to losses incurred by society either as costs to the economy or costs to the individual and his/her family from unforeseen illness-related expense.

The study identified costs of approximately £1 million (1988 prices), approximately 1/3 were public sector costs and over 1/2 were due to lost production. The remaining expenditure was that incurred directly by the individuals affected and their families (Sockett 1993). In 1993 the national cost of food poisoning was estimated at 1 billion pounds. The economic impact, therefore, is significant and needs to be seen in the context of an illness, which should be largely avoidable (Sockett 1993).

These costs do not take into account manufacturers' costs if their products are implicated as a cause of illness (particularly where this results in public warnings and product recall), the costs of cleaning, renovation, repair of equipment and workplaces, and may also include indirect cost from legal action, loss of customer confidence, decline in sales and possible plant closure. The socio-economic and psychological costs may also be higher than previously thought, and detailed analyses of the costs of preventative action must play a part in the appraisal of approaches to preventing these illnesses.

2.4. The Food Chain

Food goes through a prolonged process, often international, before it reaches our plate: from farmer/producer, through processing, distribution, storage and sale until it reaches the consumer i.e. from plough to plate.

At each step there is the potential for contamination, growth and survival of bacteria; the consumer being the final line of defence (Aston and Tiffney 1993).

Food animals carry bacteria naturally in their gut, possibly from contaminated breeding flocks. At slaughter these bacteria may contaminate the carcass.

Similarly the hide can be contaminated from the farm, therefore great care must be taken when dressing the carcass. This is especially true of the poultry industry. Contamination can also occur during transportation and at the retail outlet through unhygienic practices. Produce grown on the farm can be contaminated from the ground (the soil being contaminated by faecal matter), at the factory by cross contamination, during transport, at the retailers or ultimately through incorrect handling by the consumer (Sprenger 1997).

2.5. Food Hygiene and the Prevention of Food Poisoning

Food hygiene is more than cleanliness (CIEH 1998). It includes all practices, precautions and procedures involved in protecting food from contamination, preventing multiplication of any bacteria present, and destroying any harmful bacteria present in the food (Sprenger 1997).

Epidemiological and research data have shown that several causal factors must occur sequentially to result in food poisoning. This is commonly referred to as the food poisoning chain (Sprenger 1997), which is the chain of events associated with an outbreak of food poisoning.

In order to prevent illness this chain must be broken. To achieve this and ensure the food we consume is fit to eat and will not make us ill we all have a role to play from producer to consumer.

2.6. Roles and Responsibilities for Food Safety

The food chain consists of many links, starting with the farm and ending with the consumer: all equally important. No one person or organization has responsibility for the entire chain.

However it is important for those in charge of the various parts of the chain to relate to each other, and take the holistic view in ensuring that pure and wholesome food is conveyed along the chain (Aston and Tiffney 1989).

Legislation exists to help prevent food poisoning, and those who subject the consumer to risk can be punished; however it is sometimes the consumers themselves who cause the food poisoning (Aston and Tiffney 1989).

In order to provide safe food, there is a shared responsibility between the government, industry and the consumer as indicated below:

Table 2.3. Safe Food for All – Shared Responsibility

GOVERNMENT	INDUSTRY	CONSUMER
Food Regulations and Enforcement	Good practices for primary production and distribution	Consumer expectations and demands
Advice to Industry	Quality assurance in food processing	Acquire appropriate knowledge and attitudes
Consumer Education	Appropriate processes and technology	Utilise good practices
Information gathering	Training of managers and food handlers	Acceptance of responsibility and participation
Health Service provision	Consumer education and labeling	Action of consumer groups

NATIONAL COMMITMENT TO FOOD SAFETY

INTERNATIONAL CONCENSUS

(Griffith 1996)

The eighteenth meeting of the PHLS standing conference on food and environmental microbiology in 1994, considered how consumers' concerns on food safety had brought pressure to bear on the food industry for improvement, increased choice and variety of foods. Mr. Keith Meldrum, the government's chief veterinary officer, stated that "Consumers would be better placed to make a judgement about food scares if they were enabled to have a better perception of risk." He informed delegates measures had been put in place to improve food safety in the industry, and there had been a major review of international codes of practice on meat hygiene, (neither having had the desired effect).

The opening up of world markets meant food production and hence food safety was not just a UK or a European issue but a global one (Meldrum 1994).

The past few years have seen a series of food safety scares which have brought to the public's attention modern intensive agricultural production, and fuelled debate about animal husbandry systems, the microbiological safety of food and the morality of the way it is produced; all of which have had a drastic effect on the safety of the food we consume.

Few have been untouched by concerns about salmonella in eggs, listeria in soft cheese, cryptosporidia in water and BSE in cattle. It has been suggested that recycling animal protein in food and modern systems of farming may have contributed to these problems (Meldrum 1994).

These examples serve merely as a backdrop against which food safety issues must be considered. In respect of the domestic situation a major component of the debate about food safety is "Who is responsible?": the producer, the government or the consumer.

The answer to this question is that all have a part to play in ensuring that the food we consume is fit to eat and not going to pose a threat to public health.

2.7. Role of the Government in Food Safety

Government has a crucial role to play in ensuring food safety in the UK as it is the legislator, enforcer, educator and sometimes provider.

It clearly has a legislative role with implementation and enforcement of Acts of Parliament and regulations and is well placed to gather information and provide advice to industry on good practice.

It provides education to the public and demonstrates its commitment to food safety through health service provision. The current attitude being prevention is better than cure with resources targeted at preventative medicine.

Recent food scares have drawn public attention to the way food is produced and the government and the European Parliament have responded to the need for harmonized standards in food hygiene by the introduction of regulations and E.U. directives.

The Codex Alimentarius Commission (CAC) was established in 1962 by WHO and the Food and Agriculture Organisation (FAO) to implement the joint Food Standards Programme of protecting the health of the consumer and ensure fair practices in the trade by developing and publishing standards and Codes of Practice (CoP) for adoption by international governmental and non-governmental organizations.

Currently the proposal is for the establishment of a Food Standards Agency – a Non-Departmental Public Body with executive powers and a structure based loosely on that of the Health and Safety Commission/Executive, which would be responsible for food law enforcement.

The Agency would have to be established by statute. This has yet to occur.

2.7.1 Historical Aspects

People have known the danger of eating unfit food since earliest times and over centuries legislation has developed to prevent food poisoning (Hobbs and Gilbert 1987). Laws of ancient Israel contained information on foods to be avoided, methods of preparation and the importance of food hygiene. These still exist in traditional Jewish cuisine. Around 2000 BC, the book of Leviticus tells us that Moses introduced laws to protect his people from disease:

hands are to be washed after killing sacrificial animals and before eating

In Britain whilst legislation dealing with food was introduced as early as 1266 (Assize of Bread and Ale), it was left to the various Guilds to ensure the fitness of their foods. Communal feeding gave rise to an increased interest in food hygiene, careless handling by one person suddenly affecting a great number of people. The Industrial Revolution saw a great influx of people from the country into the towns and these had to be housed and fed. However it was only 100 years ago that the scientific basis of communicable disease including food poisoning became known when Pasteur demonstrated bacteria could cause disease (Aston and Tiffney 1993). Publicity and pressure led to a select committee in 1855, formed to deal with adulteration of food: this led to the first Adulteration of Food Act of 1860, which still forms the basis of many of the provisions of current legislation (Aston and Tiffney 1993). In 1875 the Public Health Act introduced a second strand of food law, allowing officers to take pre-emptive action by inspecting food and, if it appeared "diseased or unsound or unwholesome or unfit for the food of man" to seize it and take it before a justice of the peace.

The legislation was consolidated and amended in 1928, and in 1938 a further consolidation, the Food Act 1938, brought the two strands together. Thus by 1938,

the main elements of modern food law were in place. The Food and Drugs Act 1955 made some amendments and re-consolidated the existing legislation. Amendments were again made in the 1984 Food Act.

2.7.2. Current Legislation

Almost immediately after passing the 1984 Act the Government announced a full-scale review of food law. Existing law had remained largely unchanged since the 1930s, much of it dating from the Victorian era. However, considerable technological and social changes had radically changed food production, retailing practices and consumer behaviour (Ministry of Agriculture Fisheries and Food (MAFF) 1988).

Although legislation contained powers to make regulations which could keep pace with changes, these were inadequate and insufficient to comply with EC requirements (Howells et al 1990). Simultaneously the proliferation of food outlets made it difficult for EHOs to keep track of businesses. Legislation was cluttered and disorganized; three different statutes with similar provisions applying to different parts of the UK (Howells et al 1990).

The principal Act of Parliament, currently in force, governing the food trade is the Food Safety Act 1990, which sets down rules concerning the storage, manufacture and sale of foodstuffs, and provides for regulation and codes of practice to be made setting down guidance on various matters (Sprenger 1997 p 283). Since joining the EC there have been moves to harmonize legislation and manufacturers need to be aware of the laws of member states if they are to export their products successfully (Howells et al 1990).

The following table sets out the historical developments in food safety set against what was concurrently occurring throughout the rest of the world:

Table 2.4. Historical Developments in Food Safety History

DATE	FOOD SAFETY HISTORY
2000 BC	Moses introduced laws to protect people from disease
1266 AD	Assize of Bread and Ale
1760-1830	Processes for the preservation of food invented
1820	A Treatise on Adulterations of Food and Culinary Poisons
1848	First Public Health Act
1860	Adulteration of Food Act
1872	Adulteration of Food, Drink and Drugs Act
1875	Sale of Food and Drugs Act
1928	Food and Drugs (Adulteration) Act
1938	Food and Drugs Act
1955	Food and Drugs Act
1976	Food and Drugs (Amendment) Act
1984	Food Act
1990	Food Safety Act

2.7.3. Communicable Disease Control

The control of communicable disease is a government responsibility divided between Local Authorities (LAs) and the National Health Service (NHS). In broad terms, LAs are responsible for investigation and control of communicable disease, and, through its appointed 'proper officer' (usually a specialist in community medicine employed by the Health Authority (HA)) for enforcement of the legislation. HA's responsibility is the prevention, control and treatment of communicable disease, including health education, health visiting, immunization, hospital treatment and other relevant services. In practice both work closely together to control food poisoning. This will be dealt with under the LA's role

2.7.4. Collection of Data

Certain communicable diseases are notifiable under the Public Health (Control of Disease) Act 1984, food poisoning being one. There are also 24 diseases notifiable under the provisions of the Public Health (Infectious Disease) Regulations 1988. These include such diseases as dysentery, typhoid, paratyphoid and tuberculosis, which may be food borne.

Cases of food poisoning come to the attention of the authorities through a variety of sources. Notification, as required by law, may be received from GPs or hospitals. Complaints may also be made directly to LAs. Most outbreaks declare themselves by virtue of the number involved over a short period of time among a well-defined group of people e.g. wedding reception. However where the victims are widely dispersed, where differing symptoms prevail or where other forms of transmission occur, only careful investigation provides the basis for control.

Each LA retains a register of notifiable disease cases including food poisoning that have occurred within its district. This data is forwarded on a weekly basis to the OPCS, the data and an analysis of same is then published by the OPCS in their Communicable Disease Report.

2.7.5. The Richmond Report

The increase in reported cases of food poisoning, led to heightened media interest, loss of consumer confidence in the food industry and parliamentary concern. This concern was marked by a parliamentary committee report in February 1989 which established the Richmond Committee to look into the microbiological safety of food. The committee identified points in the chain critical to contamination of food and where controls could most effectively be applied. This approach is analogous to the HACCP (Hazard Analysis Critical Control Points) system. The committee believed

the adoption of HACCP principles would enhance food safety and commended their application.

They also considered the home a vitally important area, which incorporated the last crucial critical control points before food was eaten and stated there was urgent need for improved food hygiene education and research to establish the best way of providing this information. Whilst consumer behaviour could not be the subject of legislation, it is important to take it into account in information and advice given to the public on food labels and in education programmes (Gray and Mossel 1992). The committee also made recommendations aimed at reducing contamination of food in the home in such areas as food preparation and refrigeration.

The government's response to the report was legislative with the introduction of the Food Safety Act 1990; however, as has been seen in the ensuing years a formal food safety infrastructure alone will not prevent the increase in food poisoning. A greater awareness by the public of problems occurring in the food industry may have had a part to play in the improvement in food law but, food safety problems created by the public in their handling or storage of food in the home needs to be given as much consideration. Mishandling of food in the home contributes to a significant number of food poisoning cases (PHLS - unpublished).

2.7.6. Response to the Richmond Report

In response to the report a working group of representatives from MAFF, DHSS, PHLS and CIEH was convened to consider how to approach the problem. It was agreed to aim a government-organised campaign at domestic food handlers. A variety of approaches were considered e.g. video film, TV advertisement, but finally it was agreed to produce a simple educational leaflet to be distributed in supermarkets, GP surgeries and council offices. The rise in the figures during 1991

and 1992 is therefore significant in assessing the impact of this approach. However this must be considered in conjunction with the new definition of food poisoning adopted by government and the apparent "moved goal posts".

2.7.7. Role of the Local Authority in Food Safety

The prime role of LAs is enforcement, with a statutory duty to enforce the Food Safety Act. Control is essentially supervision of the trade and non-domestic food operations by EHOs (Clay's 1992). Food poisoning investigation is also a statutory duty of LAs undertaken by EHOs. Following notification to the LA the patient is interviewed by an EHO. Risks of transfer are considered and advice given to prevent transmission within the home or at work.

The Pennington Report of 1997 called on government and LAs to take concerted action to reduce the risk of further outbreaks occurring in the future. This involves the implementation of HACCP in butchers and similar premises and food hygiene training in food premises, schools etc.

The LA does not have a statutory duty to provide health education; however prevention is better than cure and regular contact between EHOs and the public enables them to provide this in the form of talks etc, and by way of various public campaigns. It is envisaged that improved awareness of food hygiene should help to reduce the incidence of food poisoning.

2.8. Role of Industry in Food Safety

The food industry has an important role in ensuring the safety of the food it produces. Not just caterers but farmers, manufacturers, retailers all have a responsibility to ensure the food they produce is safe to eat e.g. diseases such as tuberculosis, anthrax etc. have been eradicated at the farm, and, when employed, this approach has been successful. The control of *Salmonella, Campylobacter,*

Cryptosporidia and E. coli however presents different problems: often these lead to inapparent infections in animals, are not host-specific, and not easy to detect. This means the "stamping out" approach is unlikely to achieve a permanent solution, although this has been adopted in Sweden (Andersson et al 1993). Any approach used must be long-term and involve all the production chain.

Industry is responsible for the introduction of good practices. Quality assurance and HACCP systems go some way to ensure this. Recent legal changes require proprietors to assess and manage risks to food safety (HMSO Food Safety Act 1990 - Code of Practice No.9).

Industry is also responsible for training staff in food hygiene, showing managerial commitment and involving staff. To make systems work ownership is vital (Sprenger 1997). However research undertaken by Guerrier et al (1992) concluded that managers in the catering industry deemed food hygiene significant only when something went wrong. Consumer information is also a responsibility of the industry and could be achieved by including instructions as regards correct storage and preparation of the product on the label. This is in effect the only way industry can communicate with the consumer to ensure storage and cooking of the product is carried out in the correct manner to minimise risk.

The Foodlink initiative between the Food and Drink Federation (FDF) and the Chartered Institute of Environmental Health (CIEH) is an example of how industry and professionals can work together to achieve consumer education (Foodlink 1994, 1995).

Food safety is a major issue in the UK (Arkin 1991, Shepherd and Sparks 1992) and will undoubtedly remain of basic importance to consumer confidence in the food industry (Leach 1996). Research (Goode and Sherratt 1994) has revealed how deep

the lack of confidence in the food industry is running. Far more people mistrust than trust farmers, food companies and the government to ensure food safety. With an increasing amount of choice available to consumers, proprietors of food premises need to be more aware than ever of the complex pattern of consumer demands, including that of supplying a clean and safe product. Engell et al in 1986 felt that understanding consumer motivation and behaviour was not an option, but was an absolute necessity for competitive survival.

2.8.1. Hazard Analysis and Critical Control Points (HACCP)

The traditional approach to food control has been final examination of food samples for pathogenic bacteria (Mossel 1989). This however has a number of drawbacks (Bryan 1990).

Quality assurance, which is another approach, is seen as the responsibility of a separate department distant from the point of production. A proactive strategy is therefore necessary which would include the identification of hazards and the implementation of controls along the production line to prevent the risk of those hazards becoming a reality i.e. HACCP (ICMSF 1988). HACCP is now widely accepted as the most effective means of controlling food poisoning (WHO 1982,1988, 1990; NACMCF 1990). Having originated in the field of engineering and first developed to control microbiological hazards in food manufacture for the United States Manned Space Programme in the early 1960s, its full potential was soon noted and is now widely employed in the food industry (Bauman 1974, Peterson and Gunnerson 1974, Snyder 1986, Bryan 1990, Weingold et al 1994).

HACCP is an area where government and industry can work together to identify hazards in the production process and eliminate or control them. These controls can then be monitored and the processes adjusted accordingly (Mitchell 1992).

2.8.2. Definitions of Terms

Hazard

A hazard is something having the potential to cause harm (Worsfold 1994).

A high risk food is a food high in protein such as milk/milk products, eggs/egg products, meat/meat products, fish, shellfish or other foods which are capable of supporting the growth of infectious and/or toxigenic microorganisms and which will not undergo any further type of treatment e.g. cooking. Not usually included are foods which have a pH level of 4.6 or below and foods which have a water activity level of 0.85 or less. Foods which also may be classed as high risk include certain baked goods (e.g. with cream filling) and some types of vegetables, e.g. fresh packaged mushrooms (Farber and Hughes 1995). Whilst this specifically includes microbiological hazards it should be noted that food may be contaminated from other sources, i.e. physical such as foreign bodies and chemical such as pesticides and cleaning materials.

Risk and Risk Analysis

Risk is an estimate of the probability of a hazard occurring (Worsfold 1994). When used in conjunction with health it usually includes the magnitude of the effect of the hazard. (Dillon and Griffith 1997). Risk analysis has a highly structured approach and consists of three elements

- **Risk Assessment** - identification of the hazard and assessment of exposure
- **Risk Management** – evaluating and implementing control options
- **Risk Communicator** – receipt and provision of information and evaluating the optimum medium for communication. (Bord and O'Connor 1990)

Risk Assessment

Risk Assessment is the estimation of severity and the likelihood of harm resulting from exposure to a hazard, i.e. the risk associated with the hazard. Various approaches have been considered for conducting risk assessments for food poisoning (Bernard and Scott 1995). The simplest form is to look at a process from start to finish, identify the hazards and then determine the likelihood of that hazard occurring. In conducting a risk assessment of a food business the government has recommended a scoring system used by EHOs (CoP No.9). The total score indicates the risk category of the premises: low, medium, or high (Hall 1981).

2.8.3. Assured Safe Catering

Whilst HACCP is applied to large production lines in industry, the principle can be applied to any food operation.

Catering businesses also have a legal obligation to ensure the provision of safe food. Assured Safe Catering is a system developed for caterers to control food safety in their premises, and is based upon some of the principles of HACCP.

It involves looking at the catering operation step by step from the selection of ingredients right through to the service of the food to the customer.

By carefully analysing each step of the catering operation anything that may affect the safety of the food is identified.

The caterer can then determine when and how to control that hazard. Assured Safe Catering helps prevent safety problems by careful planning in easy steps.

The fundamental principles of Assured Safe Catering could just as easily be applied to the home, which would assist in reducing the number of cases of food poisoning attributed to the home environment (Assured Safe Catering Handbook).

2.9. Role of the Consumer in Food Safety

Changes in patterns of living and attitudes to food have resulted in the British lacking the skills of 10-20 years ago to prepare and cook food: "Fast Food" being the phrase of the day (Meldrum 1994).

Consumers have increased expectations and demands for safe food but have to accept they are the final line of defence (Gilbert 1983) and must realise that the raw food they purchase may already be contaminated with pathogenic bacteria. Similarly they themselves may contaminate the food they prepare and/or cook.

Whilst industry plays its part in ensuring food purchased by the consumer is fit for human consumption, and government plays its part in ensuring food is regularly inspected before it reaches the market, so too the consumer has a role to play through implementation of hygienic practices in the home, in ensuring that the food they ultimately consume is fit to eat.

The most fundamental concept is that raw food may be contaminated with bacteria, some of which may be pathogenic, which could cause food poisoning unless the food is correctly handled and/or processed before this occurs.

The public must be aware that certain raw foods are likely to be contaminated and must ensure they take the necessary measures for control.

They must also be aware of the potential for contamination of food in the home and must accept their role in preventing contamination of food they purchase or prepare.

The ICMSF in 1988 acknowledged that the public need a basic awareness of food hygiene if they are to ensure the food they consume is fit to eat.

This is said to include the following: -

Table 2.5. Food Hygiene Knowledge the Public Need

• The cause and effect relationship of individual actions on food safety and spoilage
• Practical measures to ensure the safety of the foods they prepare, process or store
• Proper processing and home preservation methods
• Improper food holding practices will allow bacteria to multiply to high numbers.
• The heating procedures necessary to kill vegetative forms of pathogens
• That raw food (e.g. meat, poultry, fish, eggs) carry pathogens when they enter the kitchens.
• That by handling raw food microbes can pass to hands and then to other foods.
• That cleaning cloths can transfer microbes from raw foods to equipment and surfaces
• The correct cleaning of surfaces to avoid cross contamination

(ICMSF 1988)

2.9.1. Implications of Food Safety for the Consumer

Gilbert (1983) and Todd (1989) both argued for a dual approach to the problem of rising incidence of food poisoning.

Gilbert suggested legislation and education with the emphasis being on the latter. The rationale behind legislation is that it should lead to safer foods at the point of sale.

Todd identified this as the long term goal and the food industry, and government have invested considerable time and effort in attempting to achieve this; however this does not appear to have had the desired effect in reducing the number of cases of food poisoning.

Beard (1991) states that consumer handling of food products after purchase is an area where the most unknowns occur and where many consumer complaints originate. His survey of 30 consumer pantries noted a range of improper storage practices, indicating the consumers are not fulfilling their role.

Beard recommended education as a means to reach consumers.

Educational material, in the form of leaflets, has been developed to inculcate consumers with proper food handling techniques; these will be examined in more depth in chapter 4. However the acquisition of knowledge on its own may not be enough to alter behaviour.

Jones and Weimer in 1977 stated most consumers underrate their responsibility for selective purchasing of food, proper food storage at home, and safe preparation practices. Consumers do not clearly understand or carry out safe food handling practices (Albrecht 1995).

Basic food hygiene information should be included in educational establishments. Objectives should be a change in Knowledge, Attitudes, Skills and/or Aspirations (KASA) (Bennett 1977).

Information on what the audience knows, believes and practises in regard to safe food handling is needed to develop educational programmes to foster change.

To measure the impact of education, the level of initial knowledge and the practices employed are needed as a baseline.

2.9.2. The Public Perception Regarding Food Safety

The Public regards food poisoning as an unavoidable hazard, like catching a cold (Mossel 1989, Frewer et al 1994). Again, industrial processing for safety is felt by many as a conspiracy to deprive people of naturally occurring nutrients and poison them with additives (Mossel 1989). This has led to a reduction in the use of preservatives, a decrease in shelf life and increased need for refrigerated storage.

Results of investigations of the relationship between risk, perceived risk, perceived control and perceived knowledge of food hazards indicate individuals perceive personal risk to be lower than for other people or society and personal control tends

to be seen as greater for self. No direct relationship between perceived control and risk was found although there was a direct relationship between perceived knowledge and control (Frewer, Shepherd and Sparks 1994). The public is optimistic about personal risks (Weinstein, 1980, Harris 1997). Weinstein and Klein in 1996 demonstrated an underestimation of the likelihood (or probability) of experiencing negative events. Comparisons with the mean indicate people are misjudging their risks, demonstrating an optimistic bias and an illusion of control, the public believing they have full control over their own lives (Weinstein and Klein 1996).

Food safety is considered of paramount importance to consumers (Saunders 1991). There is, however, a discrepancy between medically acknowledged risks and food safety risks as perceived by the consumer (Mosel and Strujk 1992). Problems associated with pathogens being under-rated whilst loss of nutritional integrity and toxicological risks were over rated.

People's perception of risk can contribute to their decisions on their behaviour in respect of food safety (Auty 1992). If they do not perceive their risk to be high they are unlikely to change their behaviour. If we wish to change behaviour we must demonstrate to the public what their personal risk is (Frewer et al 1994).

There has been an increase in the extent to which the risks from consuming foods are seen to be hazardous by the public (Slovic 1989). Some experts see public concern as exaggerated (Fischhoff 1989), holding the traditional view that the non-expert public is ill-informed and irrational regarding risks and food, and indeed risks in general (Fischhoff, Watson and Hope 1984). Public perceptions of risks from food related hazards might have important implications in terms of consumer behaviour (Soby et al 1994). This will be looked at in greater depth later in this study.

2.10. Previous Studies on Consumer Food Safety

Information on consumer food safety behaviour has been mainly derived from questionnaire surveys. The use of interviews does have a number of limitations. There is the problem of interpreting and verifying the respondents' answers. Goffman in 1957 noted, "I rarely believe what people say and in interview situations, I hardly believe them at all". Most people can recall important events in their lives but are unable to recall minor details. They forget or distort the details and may not be able to describe their activities accurately and to the level of detail required (Worsfold and Griffith 1997). However to date this has been found to be the cheapest way of obtaining information and is the manner resorted to by government (Goffman 1957). From 1990 - 1994 questions were included in the Omnibus Survey which giving a sample of over 10,000 respondents aged 16 and over. Generally, respondents were aware of the need to take food safety measures, the vast majority having heard the government's warnings of *Salmonella* and *Listeria*.

The table below shows the figures for 1990, 1991 and 1994.

Table 2.6 Public Awareness of Salmonella and Listeria

Year	Salmonella	Listeria
1990	97%	87%
1991	98%	92%
1994	96%	84%

(OPCS 1995)

As can be noted awareness of the above decreased slightly from 1990 – 1994 whereas awareness of the potential dangers of soft cheeses, pate etc. increased. (OPCS 1995). 23% reported a change in the way they handled/ prepared food, and 18% reported changes in the use of refrigerators/freezers as a result of advice heard over the previous years (OPCS 1995).

In an attempt to understand the increase in food poisoning, several studies were undertaken which looked at the knowledge and practices of the domestic food handler. These indicated some areas of concern, e.g. practices for the prevention of food poisoning may be inadequate, and family outbreaks are numerically very important (Foodlink/ MORI 1993). The 1994 survey re-examined the issues of the 1993 survey in more detail and identified 1 in 20 respondents had suffered from food poisoning the previous year, roughly equivalent to 2 million people, far more than official figures. The table below shows the variations that were noted for Wales from the results of the study:

Table 2.7. Welsh Results - MORI Survey 1994

The smallest proportion of respondents who knew the correct fridge/freezer temperatures 12%
The least likely to wrap or cover food in the fridge 51%
The least likely to ensure thorough cooking of food 71%
The least likely to use separate utensils for preparing raw meat and cooked foods 29%
The least likely to look at lists of ingredients on the labels while shopping for packaged foods 4%
The highest proportion not to look at cooking instructions on the packaging when shopping 19%
The highest proportion to look at preparation instructions on the packaging when shopping 21%
No one reported suffering from food poisoning illness in the last year (national average 5%).
Food not being cooked or heated properly, poor personal hygiene and food being kept at the wrong temperature were listed by respondents as the three main causes of food poisoning
Shellfish, pate and soft cheeses were listed by respondents as the three foods they would be most likely to avoid because of the danger of contamination by bacteria.

(MORI 1994)

The MORI survey of 1993 led to the development, by the FDF together with the CIEH, of a food safety programme, to promote food safety at home.

This joint initiative, launched in 1993, and welcomed by the Department of Health (DOH) and MAFF, has concentrated on organizing an annual national food safety week providing food safety information to the public.

Several studies have looked at the factors implicated in food poisoning outbreaks. Some of the findings of these studies are included in the table below:

Table 2.8. Factors Implicated in Outbreaks of Food Poisoning

Contributory Factor	USA data (Bryan)	England and Wales data (Bryan)	England and Wales data (Ryan)	USA data (Weingold)	England and Wales data (Roberts)
Inappropriate storage	21.1	38.5	24.4	23.9	17
Preparation of food in advance	22.6	57.1	-	9.9	25
Inadequate heating	15.5	15.8	23.3	20.0	7
Inadequate hot holding	16.6	-	-	17.3	2
Cross contamination	5.4	6.4	22.0	8.9	3
Inadequate reheating	10.6	26.4	-	8.5	12

(Roberts 1982, Weingold et al 1994, Bryan 1995, Ryan et al 1996)

Bryan in 1987 identified the factors that contributed to outbreaks of foodborne diseases that resulted because of mishandling and/or mistreatment of foods in homes in the US from 1973-1982. The highest figure 42% was attributed to contaminated raw food/ingredient (Bryan 1987). If one compares this with the Roberts survey of 1982 which studied 1479 general and family outbreaks which occurred in England and Wales between 1970 and 1982 then the highest contributory factor was the preparation of food too far in advance which amounted to 25%.

A comparison of the results of the two studies show marked differences. Of the Roberts study only 15% were associated with food prepared in the family home and may therefore not give a true indication of the domestic situation and associated problems.

The methodology used by Bryan consisted of gathering information from reports submitted to the Centre for Disease Control from health agencies. However not all cases of food poisoning are reported and therefore not investigated. Bryan also experienced incomplete write-up or abstracting of contributory factors. Also omitted from the review were ciguatera, paralytic shellfish and mushroom poisoning.

Later surveys indicate improper storage, temperature control and cross contamination are the most common factors implicated in outbreaks of food poisoning (see Table 2.8.). Studies indicate a substantially high proportion of food poisoning outbreaks occurring in Europe and North America is acquired in the home (Roberts 1982, Todd 1983, Ryan et al 1996). There is therefore a need to identify food poisoning hazards in the home and to direct educational efforts accordingly.

American Studies

Several studies have been conducted in the USA, which provide insights into consumer knowledge of home food safety practices, e.g. Jones and Weimer 1977, Woodburn and VanDeRiet 1985, Penner et al 1985 and USDA/FDA 1991.

Results indicated food safety education should be targeted at specific groups less knowledgeable about safe food handling practices, (Albrecht 1995, Klontz et al 1995) and that many respondents knew proper food handling concepts but did not put these into practice.

Williamson et al in 1992 noted that food poisoning was on the rise in the US, most cases resulting from mishandling of food in food-service institutions or homes

(Raithel 1988). Incorrect procedures were identified which could lead to cross contamination together with a lack of knowledge of the necessity for refrigerated storage.

Remington et al 1988 suggested certain high-risk practices are fairly common e.g. eating raw eggs, undercooked hamburgers and raw shellfish, and inadequately cleaning cutting boards; whilst a telephone survey by Altekruse et al in 1995 revealed 1/3 of respondents reported unsafe practices, e.g. they did not wash hands or take precautions to prevent cross contamination. Unsafe practices were reported more by men and occasional food preparers than by women or frequent food preparers. Outbreak investigations also indicated that consumers do not always take precautions to reduce the risk of food poisoning (Bryan 1988). This suggests they do not fully understand the hazards. A basic knowledge of microbiology may motivate consumers to use safe food handling practices.

The association of frequent food preparation, gender and age with safe practices suggest that food handling skills may be acquired through factors related to training, experience or maturation (Tauxe et al 1987). It has also been noted those who handle food on a frequent basis are more receptive to food safety information (Woodburn and VanDeRiet 1985).

Children Cooking

Children cooking is an important area of information on food hygiene practices to consider as these are the food preparers of the future. If they are taught good hygiene practices when young the hope is that they will continue these practices into adult life. Around 70% of children now prepare food (FDF 1996), the figure increasing with age; 45% of 7/8 year olds prepare food, while 80% or more of 11year olds do so. More girls than boys observe hygienic practices, the starkest difference being in

those who claim to wash their hands before touching food: 54% of girls against only 39% of boys.

More than 7 out of 10 children claim to have been told how to keep food safe. "At home" is said to be the commonest venue for food safety instruction (75%) followed by school (51%). These then would appear to be the venues to be targeted in health education campaigns.

Williamson in 1992 felt that because of the lifestyle and demographic changes in the US many children were growing up without learning the basic principles of safe food preparation: the emphasis being on convenience rather than the proper methods of preparing food (Williamson et al 1992).

Whilst research has been undertaken on food safety in the home, there are still gaps in consumer knowledge which need to be identified. It was therefore felt appropriate to undertake a new survey in the Port Talbot area targeted at people in their own homes, particularly those who do the shopping and prepare the meals.

If we are to target the resources of local government to alter behaviour of the public that is both efficient and cost effective, local information of knowledge, practices, beliefs and attitudes is of utmost importance.

This study whilst acknowledging information gained in previous studies, has concentrated on these areas.

This will be addressed in chapters 3 - 6 and the information obtained used to formulate a strategy for future health promotion campaigns.

2.10.1. Areas of concern highlighted in previous studies

Transporting Food Home

Chilled or fresh foods make up 60% of the food basket of the average European, yet surveys (Evans et al 1991, FDF-IEHO 1995) reported that the majority of people do

not use a cool bag/box to transport chilled/frozen food from the shop to home (Jones and Weimer 1977).

50% of respondents to the Sainsburys' survey of 1991 returned home after food shopping in less than 10 minutes, with 90% returning in less than 20 minutes. Again, 84% unpack and store shopping very quickly after returning home (Sainsbury 1991).

Worsfold and Griffith in 1992 identified most packed lunches were prepared 4-5 hours before consumption. However some were prepared the night before and left at ambient temperature until consumption.

Temperature Control

Temperature control has been addressed in several surveys. The table below indicates the results of the Omnibus surveys of 1991-1994, the MORI survey of 1996 and the Sainsbury survey of 1991:

Table 2.9. Knowledge of Refrigerator Temperatures

	Omnibus %	MORI %	Sainsbury %
Knew correct fridge temperature	40	12	3
Did not know correct fridge temperature	38	77	81
Gave incorrect fridge temperature	22	11	16

Following their survey Sainsbury gave away one million LCD thermometers to shoppers to help them adjust their refrigerators to a correct and safe temperature. This is an area that could be addressed by government/industry.

Several of the large supermarket chains have responded by issuing LCD thermometers to their customers. However ownership of thermometers is not the answer if people do not read them regularly nor understand how the refrigerator dials work and adjust them accordingly.

A study of the literature of domestic refrigerators available revealed data on their colour, size, number of shelves, cool drinks dispensers etc., but few details of their temperature performance under normal domestic operating conditions.

Cross Contamination

Cross-contamination as a contributory factor in food poisoning has probably been underestimated in surveillance statistics (Bryan 1982) as it is difficult to detect during short routine inspections or retrospective epidemiological investigations. Nevertheless extensive opportunities for cross contamination in the domestic setting have been found (DeWit et al 1978, Borneff 1989). Indirect evidence on potential routes of cross contamination has also been derived from surveys of the public (Beddows 1983, MAFF 1988, Spriegel 1991, Humphrey et al 1994).

Analysis of questionnaires tends to underestimate the opportunities for cross contamination, because of the lack of detail in consumer reports and/or their desire to provide an acceptable or correct response (FDF-IEHO 1995). Consumer surveys usually provide little information on actual food preparation practices, cleaning routines and hand hygiene.

Sponges and dishcloths from domestic kitchens have also been shown to harbour large numbers of bacteria (Cox et al 1989, Carlos et al 1997). Therefore it is important to make the public aware of the risks associated with contaminated cleaning materials and provide basic education on hygiene practices. Recently it was shown the use of self disinfecting sponges significantly reduced the level of bacteria within the sponges and the transfer of such bacteria to surfaces and fingers (Enriquez et al 1995).

There is a great potential for indirect and direct cross contamination in the consumer kitchen (Worsfold and Griffith 1997). The principle causes being faulty handling,

poor personal hygiene, inadequate cleaning and lack of facilities for segregation of raw and cooked foods.

Klontz et al 1995 revealed 26% of American consumers do not bother to clean cutting boards after cutting raw meats. Such behaviour leads to a high risk of cross contamination. Inspired by this Park and Cliver in 1996 set about finding a safe and efficient way to decontaminate boards. Their research revealed it was easier and more effective in respect of reduction of pathogens to clean wooden boards rather than those made of polymers and indicated that brief "cooking" of wooden boards at a high setting in a microwave oven is a cheap and effective way to kill bacteria: a very easy method for consumers to use.

Cooking/Reheating

Few surveys provide information on the adequacy of cooking/re-heating practices, the extent of advance preparation or holding practices. The MAFF survey of 1988 reported 50% of respondents prepared meals in advance and most claimed to store these in the refrigerator or freezer. 18% recognized the dangers of keeping food at room temperature.

A national survey in the US (Jones and Weimer 1977) indicated there was a common belief that meat and poultry could be kept at room temperature after cooking and that refrigeration was unnecessary; whilst in the Beddows survey of 1983, on the handling of cooked chicken in the home, 10% of respondents were prepared to leave the cooked food at ambient temperature for longer than four hours.

Use of out of date food

In the Sainsbury survey 64% indicated they would throw away products after expiry of the "use by" date; however 34% would examine it carefully before deciding whether or not to use it.

Improper Cooling

It has been suggested that improper cooling is the most frequent factor contributing to food poisoning, but no information on the methods used to cool cooked food in the home has been gathered by any survey of the public (FDF-IEHO 1995, Spriegel 1991). Evans et al in 1991 found 72.2% of respondents kept their kitchens at between 17 °C - 23 °C. Over 90% of respondents in the Worsfold and Griffith study of 1997 had centrally heated houses and the majority used their kitchens for cooling food. Only 5% were observed to transfer the cooked food to a cooler place. A common practice was to move the cooked food in its container to the back of the hob to cool. Home refrigerators are not designed to chill food rapidly, and the introduction of hot foods may cause the temperature to rise so foods within the cabinet are above 5 °C.

2.10.2. Lessons learnt from Previous Surveys

The Mori survey noted almost 9 out of 10 consumers are fairly or very confident when they shop for food; they have enough information to keep it safe to eat, although 7 out of 10 think food manufacturers should be doing more to provide information on food safety. An important factor in the Omnibus survey was 62% of respondents said they took advantage of lower food prices when food was nearing its "use-by" dates and 16% did so frequently, a practice which could cause food poisoning and discouraged by LAs.

Women are more likely than men to be aware of food safety measures (OPCS). However, men are more likely than women to know the correct refrigerator temperature for storing food (Omnibus Survey). People aged 30-59 are most likely to show awareness of food safety measures, whereas people aged over 60 are least likely to report changes in the way they prepare food or use their refrigerator. They are also less likely to know the correct working temperature of a refrigerator.

Proportionately fewer of this age group however takes advantage of cheaper prices when food is near its "use-by" date which was surprising considering their limited income (OPCS). The presence of a child in the home influences knowledge and behaviour with respect to food safety (OPCS), but the differences between this group and respondents without children is not significantly great. Before education and training programmes can be planned and materials developed, professionals must understand consumer knowledge and practices (Williamson 1992).

Valuable information has been gained from these studies, which was used to form the basis of a study undertaken in the Port Talbot area to assess knowledge of food hygiene. This in turn will be used to formulate a health education strategy for the authority.

2.11. Health Education

The generally accepted definition of health education is:

> Health Education is a communication activity aimed at enhancing positive health and preventing or diminishing ill-health in individuals and groups, through influencing the beliefs, attitudes and behaviour of those with power and of the community at large (Downie, Fife and Tannahill 1990).

Long before the Black Report of 1982 delineated the link between social class and health, environmental health professionals realized lifestyle factors lay outside the influence of both medical science and the "free choice" of individuals, factors first evident in public health measures of the 19th century, particularly those leading to cleaner water supplies: thus reducing water-borne infections e.g. cholera (McKeown. 1976, 1979).

These ideas were picked up and endorsed in the Lalonde Report (1974) where health promotion as a concept first appeared. Health education was seen to be about

changing people to fit the environment with the help of medical/health experts who had the knowledge to know what was in the best interests of their patients/public at large (Ewles and Simnet 1985, Anderson 1988).

A model for promoting health is self-empowerment, stressed by the WHO and consistent with philosophers who argue education is not about influencing people via persuasion or propaganda but by providing knowledge supplemented by non-traditional experimental teaching/learning methods (Bunton and McDonald 1996).

Health Education Theory

We can consider the operation of food hygiene training in the context of health education theory. Interpretation of this suggests further evaluation of training be warranted prior to policy development. Three approaches to health education have been recognised by several authors (Draper et al 1980, Baric 1982,Green 1984, French and Adams 1986, Downie et al 1990, Tones et al 1990).

The aims and methods used in each of the approaches are summarised below

Table 2.10. Aims and Methods of the Three Health Education Models

MODEL	AIM	METHODS
Knowledge-based	To improve health by changing people's behaviour	Information, campaigns, propaganda, modification of attitudes and behaviour
Self-empowerment	To improve health by developing people's ability to understand and control their health status within their environmental circumstances	Life skills training, self-help groups, counseling pastoral care and the promotion of self-esteem
Socio-political	To improve health by changing environmental, social and economic factors through community involvement and action	Advocacy, campaigns, community action, self-help groups, pressure groups, legislation, administrative change

(Adapted from French and Adams 1986)

Health Belief Model

If we are to change people's behaviour, we must know what knowledge they possess, where they get that knowledge from, and have an understanding of their beliefs and attitude.

The knowledge and behaviour that stays with us for most of our lives has its foundation in our home, family and school (Ackerley 1994).

The Health Belief Model has been used to explain attitudes and beliefs toward disease relative to parameters to indicate whether a group is likely to take action to reduce their risk of disease. This has been found to be dependent on beliefs of personal susceptibility and the seriousness of the illness (Becker et al 1972).

People must first accept responsibility for food hygiene in their own home before their behaviour can be changed.

The MAFF survey of 1988 showed a tendency to blame ethnic restaurants, even hospitals for causing food poisoning, but never themselves.

A change in behaviour cannot be achieved by knowledge alone and whilst studies have demonstrated a need for more knowledge, other issues need to be addressed including beliefs and attitude.

Models in Practice

The Planning Model of health education is also relevant: food hygiene courses being an example where it is expected the provision of new information will lead to changes in practice.

This follows the KAP model of health education shown below:

The KAP Model Applied to Food Hygiene Education

Knowledge from food hygiene course (K)

↓

Attitude (A)

↓

Changes in food handling practice (P)

The validity of this simple, unidirectional, linear relationship between the three factors however has been tested in many situations and found to be inadequate (Coutts and Hardy 1985).

Although many initiatives based on the KAP model have failed, successes have also been noted (Hamilton et al 1980).

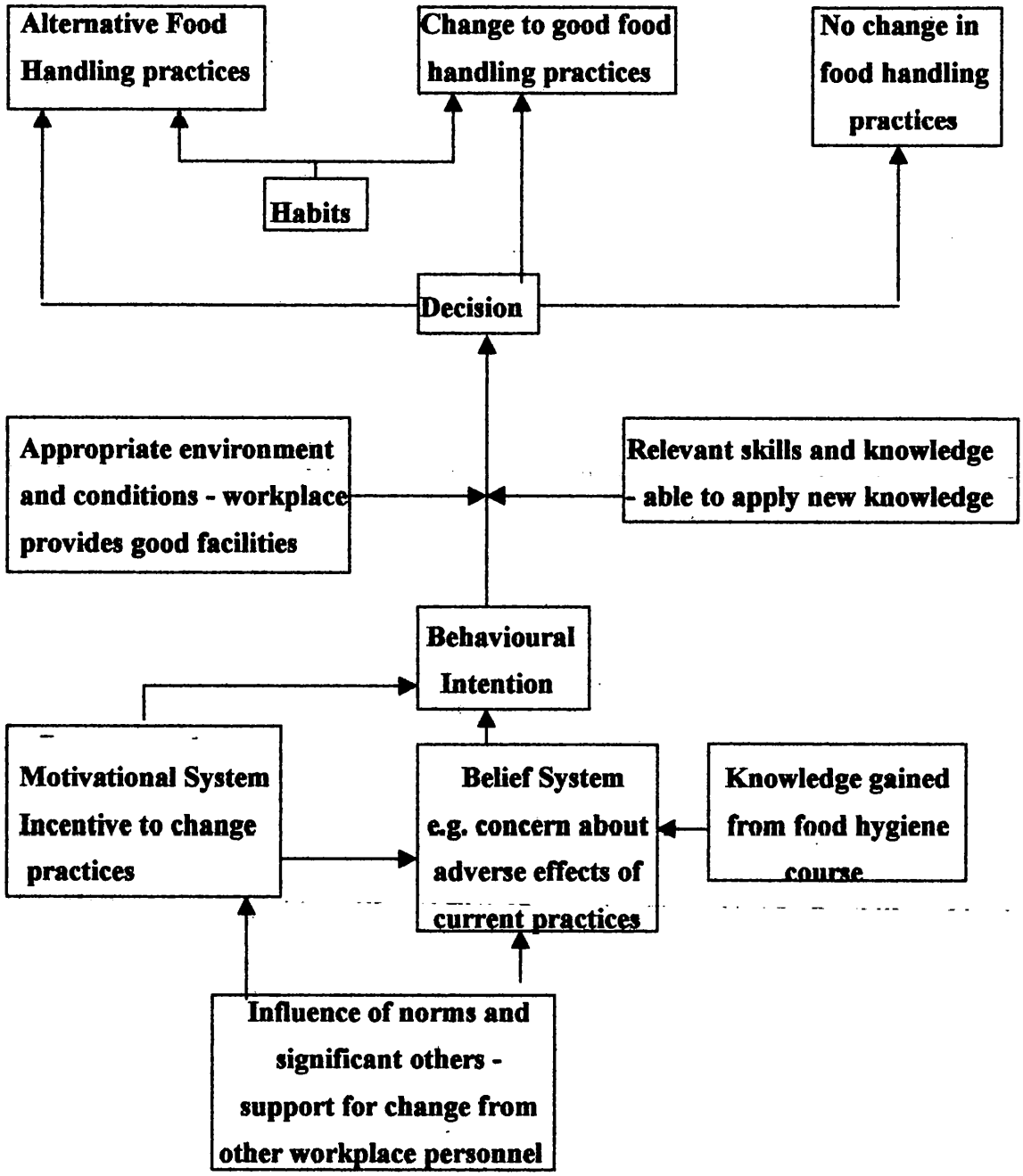
Success rates are improved where the knowledge base of the target groups is low. If the group already has a level of knowledge of the subject, it is more difficult to bring about behavioural change solely by the provision of information.

Food hygiene education for domestic food handlers may therefore not be effective at altering behaviour, especially if, as is likely, the participants have preconceived ideas about food hygiene.

An example of a planning model, which takes account of social and environmental factors, is Tones' Health Action Model which synthesizes the Health Belief Model and the Theory of Reasoned Action and takes account of a wide range of relevant factors (Tones 1979).

Application of Tones' Health Action Model to food hygiene education is illustrated below:

Fig 2.1. Tones Health Action Model Applied to Food Hygiene Education



(Rennie 1995)

All the recognised influencing factors are incorporated – knowledge, the influence of norms, incentive to change behaviour, facilitating effects, and the development of personal skills.

2.12. Food Hygiene Training

There is now professional acknowledgment that food poisoning is a domestic issue and the public is advised by many sources to practise good food hygiene.

However if we are to have a permanent effect on the incidence of food poisoning we must target future generations, i.e. our young people. The best way of achieving this is via educational establishments. However, food hygiene is no longer taught as part of the core curriculum with it receiving less attention than previously (Bender 1994).

The information gleaned in this study will demonstrate the need for a national education programme with food hygiene being taught to all pupils as part of the national curriculum in schools. Without it being a part of the core information received at school there will be limitations to how useful extracurricular material can be, and indeed, limitations on how much the public themselves are prepared to receive (Domestos Bulletin 1997).

Food hygiene qualifications are offered by a number of agencies in the UK. The courses are normally targeted at food industry employees with course content related to workplace activities.

However, much of the education is conducted away from the food handling working environment and could be applied to the domestic situation.

Research has indicated mandatory courses are more effective in terms of penetration than voluntary programmes (Walker 1978, Penniger and Rodman 1984, Feun and Wright 1986), and the need for reinforcement of the messages as improvements in hygiene is temporary (Palmer et al 1975, Jackson et al 1977, Kneller and Bierma 1990).

Whilst training is compulsory for businesses it would be impossible to replicate in the domestic environment.

There is also a lack of evidence of improved food hygiene resulting directly from training programmes although post course assessments demonstrate improvements in knowledge (Tebbutt 1992, Worsfold 1993).

2.13. Background to the Present Study

Attempts have been made by government and industry to address the increase in food poisoning. However it would appear this has not had the desired effect. Minimal work has been carried out with consumers, albeit statistics indicate many cases emanate from the home and surveys reveal a lack of basic hygiene knowledge (Ryan 1996, Evans 1998)

To develop cost-effective strategies for health education, educators need to know if people behave as they say they do. Information on knowledge, beliefs and attitudes would therefore assist in targeting future campaigns to change behaviour (Ackerley 1994).

2.14. Aims

The aims of this study were:

1. To investigate food hygiene knowledge of residents of Port Talbot
2. To examine areas of the mass media and evaluate the information provided
3. To assess beliefs of the general public with regard to food preparation practices
4. To investigate peoples attitude to food safety
5. To formulate a strategy, for use by local authorities, for food hygiene education

2.15. Objectives

The objectives were to:

1. Design a questionnaire and undertake a survey to assess food hygiene knowledge
2. Design checklists/audits to assess the role of the mass media in providing food hygiene information

3. Design a questionnaire and undertake a survey to assess food hygiene beliefs
4. Design a questionnaire and undertake a survey to determine attitudes to food hygiene
5. Based on the data obtained draft an education strategy suitable for a local authority

Chapter 3

Port Talbot Survey

3. PORT TALBOT SURVEY

3.1. Introduction

The knowledge that the public has about safe food handling affects the practices they employ in their kitchens (Albrecht 1995). Investigations into outbreaks of food poisoning have indicated that consumers do not always take the necessary precautions to reduce the risk of food poisoning (Bryan et al. 1988). This may be because they do not have the necessary knowledge. If we are to improve domestic food handling practices we must provide them with the necessary food hygiene information (Albrecht 1995).

1568 general outbreaks of infectious intestinal disease in England and Wales were reported to the CDSC between January 1st 1995 and December 31st 1996 (CDR 1998). 341 (21%) of these were mainly foodborne. Of the1568 outbreaks, 52 (3%) occurred in the home (CDR 1998, Evans et al 1998). Of these 52 outbreaks, 45 (87%) were transmitted by food. Of the outbreaks that were foodborne, 13% occurred in the home. It must be borne in mind however that as these figures only relate to outbreaks and do not include sporadic cases, the actual number of cases of food poisoning occurring in the home may be much larger. It is interesting to note that of the 991 outbreaks that occurred in hospitals and residential homes for the elderly, only 27 (2%) were transmitted by food. Also of the 449 outbreaks that occurred in commercial type premises 242 (53%) were transmitted by food (Evans et al 1998). An item of food may go through a long and complicated route before reaching the consumer - where problems can and do occur. The new food legislation was designed to ensure this progression is tightly controlled so food leaving the retailer or caterer is of the highest possible microbiological standard. However, due

to possible malpractice in the home (Worsfold and Griffith 1996), law alone cannot ensure food eaten by the consumer is of the same high standard.

It is interesting to note the regional variations in reported cases of food poisoning:

Table 3.1.Reported Cases of Food Poisoning in England and Wales by Regional Health Authority

Health Authority	1982	1990	% Increase
Northern	661	4108	572
Trent	918	5424	491
South Western	689	3912	468
South Wales	**666**	**3076**	**362**
S E Thames	755	3402	351

These figures are set against an overall increase for England and Wales of 290% (i.e. 1982 - 14,243, 1990 - 55,535, Source: DOH). It is noted from the above that Wales is among the five health authority regions with the highest increase in incidence of food poisoning cases per 100,000 of the population over the period 1982 - 1990. The PHLS/CDSC unpublished, which includes reports from EHOs, laboratories and proper officers, records the common locations of outbreaks of food poisoning as follows:

Table 3.2.Common Locations of Outbreaks of Food Poisoning 1985-1992

Location	1985	1986	1987	1988	1989	1990	1991	1992
Private Houses	259	326	324	320	820	793	792	N/A
Restaurants/Hotels/Receptions	64	71	92	90	102	102	101	121
Hospitals	36	33	26	21	16	10	15	6
Institutions	19	19	13	29	19	40	27	23
Canteens	10	9	4	14	5	8	8	13
Schools	8	8	3	6	7	4	7	12
Farms	3	2	-	3	-	2	1	1
Shops	5	4	13	11	12	6	17	18

(Sprenger 1997)

As can be seen the most common location for outbreaks of food poisoning is private houses; however in most investigations of family outbreaks the suspect food is never identified. If the ill members of the family have not recently consumed food outside of the home then the place of outbreak will usually be recorded as a private house. However, contaminated food purchased from shops, which may or may not have been mishandled by the purchaser, may have caused many of these outbreaks. If the public is to be provided with food hygiene information, there is a need to first be aware of what information they already have. In this chapter the food safety knowledge of residents of Port Talbot is assessed via a questionnaire-led survey. The results will be compared with those of previous surveys highlighted in Chapter 2

3.2. Port Talbot Survey

The aim of this survey was to investigate the food hygiene knowledge and related activities of residents of Port Talbot, with a view to assessing lack of knowledge and thence to identify areas to be targeted in future health promotion campaigns. The information gained in this survey together with that of chapters 2, 5 and 6 would be used to produce a strategy for health promotion, which was both efficient and cost effective.

A general questionnaire was designed and distributed to 84 households. This was analysed: the results relating to food hygiene obtained, plus that of contemporary surveys, provided useful information on aspects of consumer knowledge and suggested a lack of knowledge in key areas.

These areas related to both factors acknowledged for many years and to others related to the use of technology in the kitchen and new products.

3.3. Method

Scope of the Survey

Port Talbot is an industrial town on the South Wales coast between Cardiff and Swansea. The borough includes both rural and urban areas and has a population of around 40,000, diversifying between wealthy middle class and socially deprived.

For the purposes of this study it was decided to target a cross section of residents. To get a representative sample each twentieth house was visited, irrespective of size, location or resident, and an interview conducted with the resident who normally carried out the food shopping and prepared the meals. If no answer was obtained at the dwelling the interviewer moved on to the next twentieth house.

Similarly if the person who answered the door did not undertake the shopping or the cooking, they again moved to the next twentieth house.

Using this method a total of 84 questionnaires were collected.

Structure of the Investigation

To achieve the aims of the survey, it was decided to use a structured interview format on a one to one basis. This method was chosen as it was thought to be more reliable and providing more in-depth knowledge than a postal questionnaire. It also allowed scope for more detailed questioning and discussion with the respondent where there was a need for clarification or to pursue specific areas of knowledge.

A structured interview was designed and administered as a pilot survey to five employees of the LA, divorced from the environmental health department, therefore having no previous knowledge of the survey or of the EHOs role.

Appropriate amendments were made resulting in the format, used for the rest of the survey. The amendments were very minor and related to clarity of the questions.

It has already been noted that interviewees will often give the answer they feel is wanted by the interviewer and not what they necessarily believe, know or do. It was therefore felt it would be more appropriate and give a truer picture of consumer knowledge if persons other than EHOs conducted the interviews.

Approaches were made to the local tertiary college with a view to utilizing students for this purpose. A meeting with the principal identified "A" level statistics students as being the most available. The students carried a letter of authorization from the LA, which demonstrated the survey was bona fide, and undertaken with the permission of the LA. Prior to undertaking the survey the students involved were trained in interview technique by the college and in basic food hygiene by the author.

Subject Areas

The questions were designed to elicit as much information about the shopping, cooking and eating habits of the respondents, in particular their knowledge of food hygiene and safety, and related to the following areas:

- thawing, preparation and cooking of food including re-heating
- peoples knowledge of food storage and temperature control
- how people decide if food is fit to eat
- knowledge and use of microwave ovens
- previous illnesses which included food poisoning symptoms
- general food poisoning knowledge
- sources of information on food hygiene

Other questions were also included to give general information and related to the following areas:

- general information on respondent, e.g. age, sex, marital status
- appliances used in the kitchen

- where people purchase and eat food when away from the home
- how often people go shopping
- their shopping habits, e.g. do they look at best before dates etc., do they purchase frozen food, how do they carry their shopping home, the time lapse in carrying their purchases home

The Interviews

The interviews were conducted by visiting the respondent in their own home. The interviewer introduced him/herself and asked if the person answering the door personally went shopping for food and if they ever did any cooking in the home, to ensure the person interviewed was the one normally conversant with these tasks.

If the response was yes the interview proceeded, if no and the person responsible for these tasks was not available, then the interviewer moved on to the next twentieth property.

The questions were presented to the interviewees, their responses were elicited by use of flash cards and recorded on the question sheet.

During the interviews great care was taken not to influence the replies given. Interviewees were not provided with the questions in advance as is was felt this could have instigated prior research or collusion and would have affected the validity of the information gained.

3.4. Results

At the conclusion of the survey 84 respondents had been interviewed and it is on the information gained from these questionnaires that the results of this survey are based. Answers were obtained to a number of questions relating to food safety under twenty-nine separate headings.

The responses to these questions, some of which involve a number of separate answers, are shown in Appendix 1. Missing cases represents the number of cases out of 84 that did not reply to that particular question.

The most significant findings of this survey were as follows: -

3.4.1.General Information

The following table itemises the general information obtained from the respondents:

Table 3.3. Sample Characteristics

Category	Percentage
Male	25
Female	75
Aged 35 – 44 years	30
Aged over 44 years	48
Aged less than 35 years	22
Married/Living together	71
Widowed	13
Single	10
Separated/Divorced	6
In full time employment	40
In part time employment	17
Retired	19
Students	6
Unemployed	18
Children in household	28
No children in household	72

The majority of respondents were female aged over 44 who were married or living with a partner. Only 41% were in full time employment and 17% were in part time employment. Only 28% had children living in the household.

Respondents were also questioned regarding the appliances they used in their kitchen. The following table indicates the responses:

Table 3.4. Appliances used in Kitchens

Appliance	Percentage
Cooker	99
Refrigerator	66
Microwave	64
Fridge/Freezer	59
Freezer	55
Pressure Cooker	40
Slow Cooker	13

Whilst 99% had use of a cooker only 66% had use of a refrigerator, therefore 44% did not have access to refrigerated storage. Only 63% of respondents used a microwave whilst 40% used a pressure cooker and 13% a slow cooker.

3.4.2. Eating Out

Eating out is not a regular pastime in Port Talbot (see Appendix 1) with only 11% eating pub meals once a month, 17% dining in a restaurant once a month and 5% eating in a hotel. 19% eat in a work/school canteen every day. 16% stated that they buy food from take-aways 2-3 times a month and 13% buy food from a café or snack bar once a week. Home made sandwiches were more popular than shop bought with 83% eating home made more than once a week, only 13% eat shop bought sandwiches more than once a week. Shellfish would appear not to be too popular in the area with only 5% eating shellfish more than once a week.

3.4.3. Shopping

74% of respondents shop for food once a week with 23% going more frequently. Whilst shopping 85% look at the use by/best before dates with 80% looking at the condition of the packaging (see Appendix 1).

3.4.4. Storage

55% of respondents look at the storage instructions on food when they purchase it. 77% of respondents purchase both chilled and frozen foods however only 1% always carry chilled food home in an insulated container with 5% always carrying frozen food home in an insulated container.

When storing food in the refrigerator 67% always covered it with 24% sometimes covering it and 10% never covering the food. 86% stated they would always cover raw meat or put it on a plate. 6% would not.

3.4.5. Refrigeration

68% of respondents had never measured the temperature of their refrigerator. 44% of those questioned did not know the correct temperature range at which their refrigerator should be kept. 31% gave the wrong temperature and 37% had never adjusted the temperature of their refrigerator. 63% of those interviewed put food in the refrigerator wherever there was space, only 36% stored meat at the bottom of the refrigerator, and 32% sometimes put meat at the bottom.

3.4.6. Condition and age of food

The following table demonstrates how respondents decided if food was fit to eat:

Table 3.5. Judgement of Fitness

Factor	Percentage
Use by/best before dates	93
General condition	88
Smell of food	76
Presence of mould	69
Count days since purchase	53
Feel of food	53

The largest percentage judged food by its use by date, which was encouraging. However 76% judged the food by its smell, and 53% would judge the fitness of a food by its feel.

3.4.7. Thawing

78% of respondents cooked frozen chicken, of these 73% thawed the chicken in the kitchen, only 14% thawed it in the refrigerator. 5% thawed it in the microwave. 91% left the chicken to defrost slowly at room/refrigerator temperature. However 3% thawed it in cold water. When questioned 41% would thaw a 3lb chicken for some 5 - 12 hours, with 9% leaving it for 18 – 24 hours and 13% leaving it thaw for longer than 24 hours.

3.4.8. Food Preparation

52% of those interviewed prepared meals in advance either for eating later that day or for another day. Of these 29% stored the cooked meals on a kitchen work surface and 22% stored the food in a saucepan on top of the cooker. 71% stored the cooked meals in the fridge with 36% storing them in the freezer. 18% stored cooked meals in the microwave and 16% in the oven, 4% in the grill compartment of the cooker and 2% just kept it hot.

3.4.9. Microwave Cooking

64% of respondents stated they used a microwave. Of these, 20% did not know the power of their microwave. Only 54% left food to stand for the recommended time after using the microwave, and 13% never left food to stand for the recommended time. However 30% of respondents eat chilled ready meals and 45% eat frozen ready meals more than once a week.

The following table demonstrates the uses for microwaves:

Table 3.6. Use of Microwaves

Use	Percentage
Defrosting other foods	65
Reheating other food items	65
Cooking other food items	48
Reheating frozen ready meals	46
Reheating chilled ready meals	43
Defrosting joints of meat	28
Defrosting chicken	28
Cooking joints of meat	11
Cooking chicken	9

3.4.10. Cooking

Charts included overleaf demonstrate the responses given regarding the time interviewees would cook a 3lb fresh and frozen chicken for, to kill any bacteria present. It is noted that the responses are very similar.

Home cooking still seems to be the norm in the Port Talbot area with 94% eating home cooked meals more than 2 - 3 times a week and 38% eating home cooked desserts more than 2 – 3 times a week.

Vegetarian cooking would not appear to be popular in the area with only 14% eating vegetarian meals more than 2 – 3 times a week and 56% never eating vegetarian meals.

Fig.3.1. Cooking Time for a 3lb Fresh Chicken

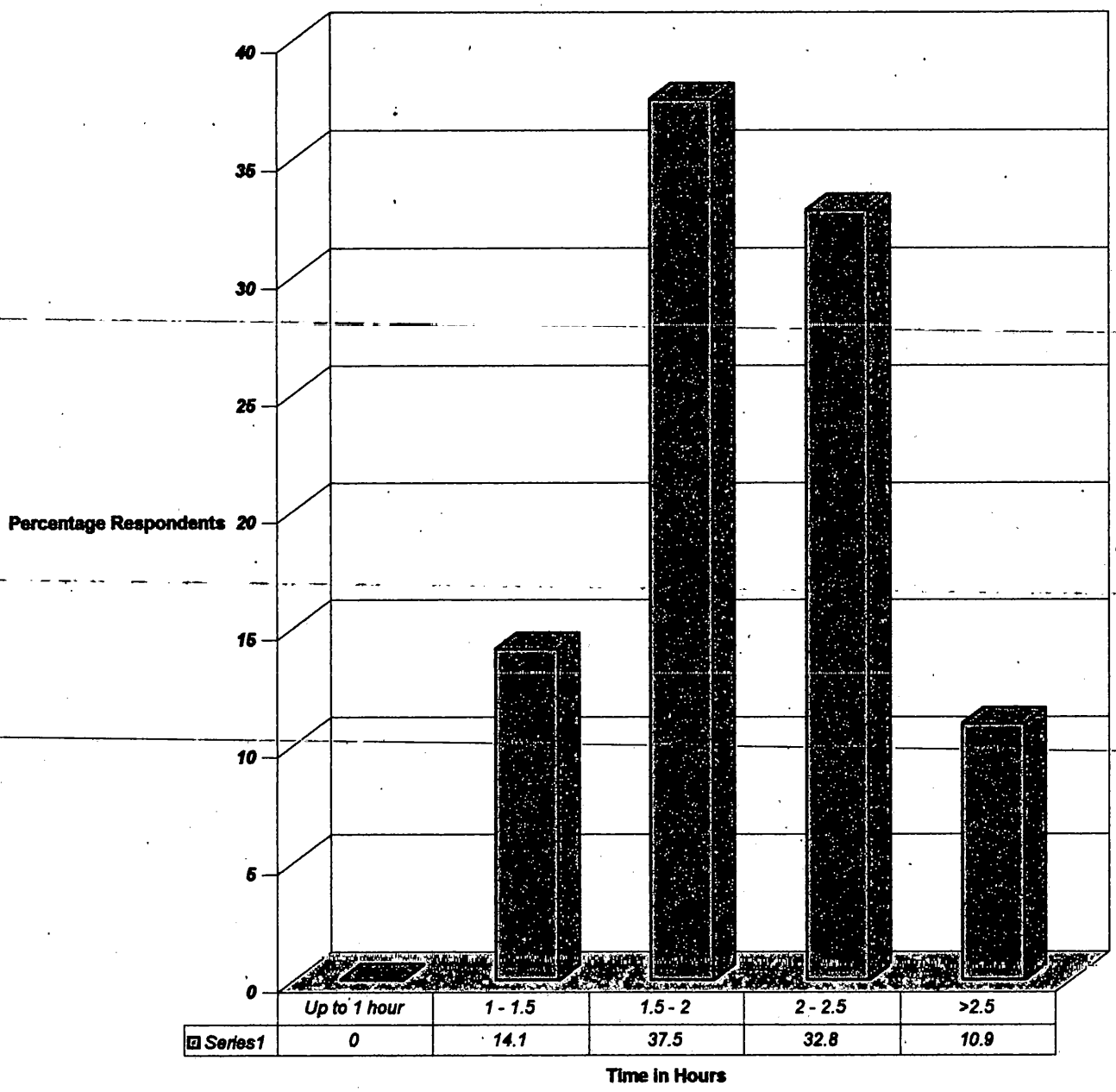
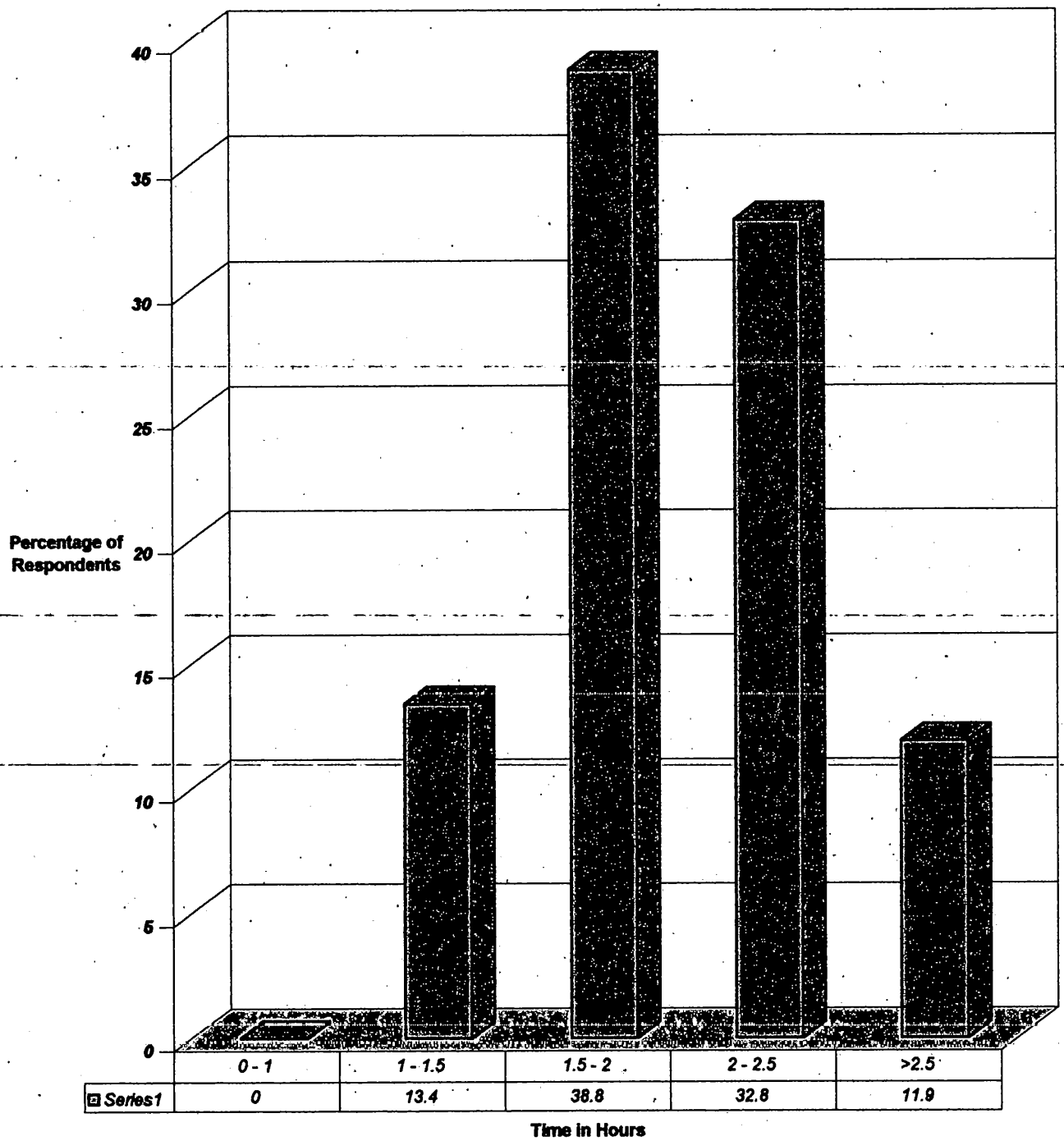


Fig. 3.2. Cooking Times for a 3lb Frozen Chicken



3.4.11. Reheating

The table below indicates how respondents would reheat meals that they had previously prepared:

Table 3.7. Methods of Re-heating Previously Prepared Meals

Method	Percentage
Microwave Oven	64
Conventional Oven	18
Saucepan on the hob	16

The majority 64% of respondents choose to reheat previously prepared meals in a microwave, 18% however choose to reheat in a conventional oven and 16% reheat meals by use of a saucepan on the hob.

3.4.12. Food Poisoning

86% or respondents thought that food could be made safe against food poisoning. The table below demonstrates the ways that respondents thought food could be made safe:

Table 3.8. Ways of making Food Safe

Method	Percentage
Heating	81
Freezing	66
Chilling	29
Microwaving	22
Other (not stated)	6

However, 31% of respondents did not understand that keeping food at room temperature or contamination of food after cooking were causes of food poisoning

(see Appendix 1). The following table shows what respondents thought were common sources of food poisoning:

Table 3.9. Common Sources of Food Poisoning

Source	Percentage
Poultry	91
Shellfish	82
Meat Pies/Pasties	70
Ready made meals – chilled	69
Eggs	60
Pork	51
Canned fish	33
Ready made meals – frozen	32
Other dairy products	31
Lamb	25
Beef	21
Milk	19
Cakes/Pastries	12
Stew	11
Home made soup/gravy	6
Vegetables	6

Poultry was identified by 91% as a common source of food poisoning with 82% identifying shellfish. Only 70% thought meat pies and pasties to be a common source and only 60% identified eggs. It is noted from the results that only 12% thought cakes and pastries to be a common source of food poisoning, only 11% thought stew and more alarmingly only 6 % thought home made soup/gravy: all acknowledged high risk foods.

In addition, 53% of respondents thought restaurants and takeaways were most responsible for food poisoning. 19% thought a sandwich/snack bar most responsible

with only 9% blaming their own home and 1% a friend or relative's home. Of those who felt restaurants to be responsible 100% blamed Indian restaurants with 44% blaming Indian takeaways, 32% Chinese takeaways and 3% Burger bars.

The table below indicates what respondents thought, from a list of options, were the risk factors associated with food poisoning:

Table 3.10. Risk Factors of Food Poisoning

Cause	Percentage
Keeping food too long	94
Flies	94
Inadequate thawing	90
Undercooking	89
Cross contamination	88
Insects/cockroaches	82
Reheating food	81
Thawing then refreezing	81
Poor handwashing	80
Rats or mice	80
Leaving food uncovered	75
Animals/birds	70
Contamination after cooking	69
Keeping food at room temperature	69
Microwave cooking	30
Slow cookers	18
Canned food	10

In addition, 82% of respondents stated they took precautions against food poisoning; however 8% did not and 10% didn't know whether they did or not (see Appendix 1).

The following table shows what respondents thought caused food poisoning:

Table 3.11 Causes of Food Poisoning

Cause	Percentage
Salmonella	95
Bacteria	92
Listeria	92
Botulism	80
Mould	76
Toxins	72
Viruses	69
Staphylococcus	51
Chemicals	45
Clostridia	31
Metals	21
Campylobacter	21
Didn't Know	1

95% acknowledged salmonella to be cause of food poisoning, 92% bacteria and listeria and 80% botulism. All of which have had media coverage over the past few years. 51% identified staphylococcus, 45% chemicals and 21% metals. Only 21% stated campylobacter to be a cause, even though it now causes more food poisoning per annum than any other bacteria.

3.4.13. Illness

In the previous six months only 15% had had any sort of stomach upset, with 31% of the members of their household suffering the same symptoms. 77% of those who had experienced symptoms did not report the illness to their doctor and only 8% thought the stomach upset could have been due to food poisoning or something they had

eaten. 46% thought it was due to a bug/virus, 8% nerves or shock, 8% morning sickness/pregnancy and 23% stated alcohol or a hangover.

Of the respondents who thought it could have been due to food poisoning 100% blamed shellfish and this had been consumed at friend's or relative's home.

None of those questioned had reported their illness to the environmental health department.

3.4.14. Information available

When questioned about the availability of information regarding food safety and hygiene, 37% thought that there was enough information available with 57% thinking there wasn't and 6% didn't know. The following table lists the places respondents would go to get information on food safety:

Table 3.12. Places respondents would go for information

Place	Percentage
Environmental Health Department	81
Doctor/Health Centre	58
Health Promotion Unit	58
Supermarket	48
Newspapers/Magazines	46
Cookery Books	42
Library	38
School/College	26
Friends/Relatives	19
None of these/Don't know	4

The most popular answer given was their environmental health department (81%), with just over a half saying their doctor or health centre (58.3%) or a health promotion unit (58.3%).

3.4.15. Provision of Information

Following on from this perceived lack of knowledge, visits to buildings to which the public have access, e.g. health centre, libraries, shopping centres, revealed a plethora of information in the form of educational material.

Some were not as obvious as others and some were inaccessible unless people were employed in the food industry or had a professional interest in food. Also, certain information required a written request, which in this age of convenience means wasted time and effort for many consumers.

The sources and types of information available are listed below:

Table 3.13. Sources and Types of Information available

Source	Type of Information
Food Retailers	Leaflets, shelf markers, information on bags, free fridge thermometers, free phone advice
Food Manufacturers	Storage and cooking instructions
Food Producers	Leaflets
Trade Associations	Leaflets
Related Industries	Leaflets, advertising e.g. Domestos
EHOs	Personal advice, leaflets
General Practitioners	Personal advice (reactive), leaflets
Government Departments	Leaflets, videos, road shows
Educational Establishments	Taught lessons
Health Promotion/Education	Leaflets, posters, videos
Television and Radio	Current news, Cookery programmes
Newspapers	Current news (facts and hype), advice
Women's magazines	Advice, general information, recipes
Friends and Family	Word of mouth experiences, advice

Many new products on the market rely on refrigeration. Consumers need to be informed of the differences between new chilled foods and traditionally processed foods with which they are familiar.

The number of food products that can be cooked/reheated in a microwave are also increasing together with the introduction of new technologies which requires additional information to the confused consumer.

In addition, many foods that have been on the market for years have undergone changes such as removal of preservatives. This means the food has to be refrigerated or has a shorter shelf life. The consumer needs to be informed of these changes.

The general public needs to be taught the basic and most important facts. In 1977 the Department of Health and Social Security demonstrated this with their health notice on the safe preparation of turkeys (DHSS 1977). The advice given is reinforced at Christmas time, the message being understood by the majority of the population. (Certainly the respondents in this survey knew how to defrost and cook a chicken). The message was simple, referred to only one product, was reinforced regularly and was effective. A lesson in education that should be heeded.

3.5. Discussion

There would appear to be differences in the public's perception of the causes of food poisoning in Port Talbot and the country in general (see Tables 3.10. and 3.14). Of relevance is the importance put on the presence of pests as the cause of food poisoning and the number who blamed microwave cooking. Preparing food in advance and storing meals on work surfaces at ambient temperature have been recognised for some years as contributory factors to food poisoning. (29% of Port Talbot residents prepare meals in advance and again 29% store cooked meals on a worksurface at ambient temperature). However very few educational campaigns have focused on these vital points.

The majority of respondents were aware of issues such as the importance of adequate thawing of poultry (90%), thorough cooking (89%) and good personal hygiene

(80%). Most educational material on food hygiene instructs people to carry out certain practices without explaining why they should do them. The real object of health education should be not only to inform people of what they should do but to tell them why they need to do it so that they themselves will be continually motivated to maintain safe and hygienic practices.

The results of the survey indicate a need to explain the importance of the relationship between time and temperature in preventing food poisoning – 77% of respondents never carry frozen food home in an insulated container, 75% never carry chilled foods home in an insulated container, 73% of respondents thaw frozen chicken at room temperature in a kitchen, 14% would cook a 3lb chicken for less than 1 hour 30 mins. 37% had never adjusted the temperature of their refrigerator (see Appendix 1). People also need to be aware that many foods, particularly raw meat and poultry, are contaminated with pathogenic bacteria when they are purchased; only 36% of respondents always stored raw meat at the bottom of the fridge. Procedures carried out from thawing a frozen chicken to serving the cooked end product offer numerous opportunities for the spread of contamination via hands, equipment and surfaces, (69% acknowledged contamination of food after cooking to be a common cause of food poisoning). If there is not strict control of hygiene and storage temperature at all stages then there is a high probability that any pathogen present will survive and multiply.

Some of the weaker points of knowledge highlighted in the survey relate to the use of old technology such as refrigerators and newer technology such as microwaves The refrigerator is often seen as a miracle object that can keep food fresh forever. If people do not know the operating temperatures of their refrigerator, they cannot be confident it is cold enough to prevent multiplication of pathogenic bacteria (only

56% of respondents knew the correct temperature for their refrigerator). Refrigerator temperatures above the recommended storage temperature of 1 - 5 degrees Celsius will invalidate the "use by" dates of many perishable goods, if bacterial growth is the major factor determining product acceptability.

Microwaves as indicated by the survey are often used incorrectly (See Appendix 1). Some users do not observe the standing time (13%) and others do not know the power of their ovens (20%), making it difficult to follow the manufacturers instructions. In addition to this, through no fault of the consumer, microwave ovens have had a bad press in previous years. The Consumers Association reported in 1990 nine out of ten compact microwave ovens tested failed to reheat "cook-chill" foods adequately (Anon). This coupled with the previously mentioned misuse of refrigerators could be detrimental to food safety.

86% of respondents thought food could be made safe against food poisoning. Of these however, 66% quoted freezing and 29% quoted chilling as a method of making food safe; 22% thought microwaving and 6 % quoted other ways. These results indicate that whilst people acknowledge food can be made safe they are not conversant with temperature control: an obvious area for future health education.

Consumers questioned in the Mori survey believed the main causes of food poisoning in the home to be cooking food improperly, poor personal hygiene, work surfaces not being kept clean and food being eaten after its "best before" or "use by" dates. The difference in the factors identified by Roberts also in 1993 are quite noticeable The top four in the Roberts study being preparation too far in advance (25%), storage at ambient temperature (17%), inadequate cooling (14%) and inadequate reheating (12%). The top four factors identified in Port Talbot were keeping food for a long time (94%), flies (94%) – known to carry disease but not

often identified in other studies, inadequate thawing of frozen foods (90%) and undercooking (89%). The factors identified by the residents of Port Talbot may indicate a lack of knowledge of temperature control: an area that needs to be addressed. Cross contamination on the other hand was implicated in only 3% in the Roberts study, whereas it was identified by 88% in the Port Talbot study.

Children aged 9-14 surveyed in 1996 as part of the FDF Survey, identified food not heated/cooked properly, contamination from pests, insects and pets and poor personal hygiene as the most likely causes.

A survey carried out by CDSC in 1980 showed 79 out of every 100 frozen chickens purchased from normal retail outlets contained salmonellas. In the Port Talbot survey 95% thought salmonella to be a cause of food poisoning and 91% of respondents thought poultry a common source.

In December 1990, 99% of households in Great Britain had a refrigerator and 52% a microwave (Waterson 1992). In Port Talbot, however only 66% had a refrigerator and 63% a microwave borne out by the results of the survey in that many respondents did not know how to use a refrigerator or microwave effectively.

When questioned as to where they would go to obtain information on food safety, the most popular answer given was their environmental health department (81%), with just over a half saying their doctor or health centre (58.3%) or a health promotion unit (58.3%). In practice we found that people do not use these sources.

Over a twelve month period records were kept of requests for information on food safety from the Port Talbot Environmental Health Department – during this time only two requests were made of the department: one of these was from a commercial premises and the other was from a student in a local college.

57% of respondents felt there was not enough information on food safety available. This is surprising considering the amount of literature available (see Table 3.13). It is also surprising that with the availability of literature, poor practices that have been taking place for years are still happening.

3.5.1. Comparison with Previous Studies

Previous studies have shown domestic knowledge and practices relating to the prevention of food poisoning may be inadequate and family outbreaks of food poisoning are numerically very important (MORI 1993, Foodlink 1994).

The following tables compares some of the results of the Port Talbot survey with those of other recent studies:

Table 3.14. Comparison of the Port Talbot Survey with other Recent Studies

Contributory Factor	USA data (Bryan)	England and Wales data (Bryan)	England and Wales data (Ryan)	USA data (Weingold)	Port Talbot data
Inappropriate storage	21.1	38.5	24.4	23.9	68.7
Preparation of food in advance	22.6	57.1	-	9.9	94.0
Inadequate heating	15.5	15.8	23.3	20.0	89.2
Inadequate hot holding	16.6	-	-	17.3	80.7
Cross contamination	5.4	6.4	22.0	8.9	68.7
Inadequate reheating	10.6	26.4	-	8.5	80.7

(Weingold et al 1994, Bryan 1995, Ryan et al 1996)

It is noted that the respondents to the Port Talbot survey felt the factors listed above to contribute more to outbreaks of food poisoning than the respondents to the other studies. 38.5% thought inappropriate storage to be a contributory factor to food poisoning in the Bryan study of 1995 whereas 68.7% thought it to be so in the Port

Talbot survey. 23.3% identified inadequate heating in the Ryan survey of 1996 whereas 89.2% identified it in Port Talbot. Similarly 17.3% thought inadequate hot holding to be a contributory factor in the Weingold survey of 1994, whereas 80.7% thought it to be so in the Port Talbot survey. Again 5.4% identified cross contamination in Bryan's survey in the USA whilst 68.7% identified it Port Talbot. However if we compare the results of the Port Talbot survey with those of the MORI survey we note more similar responses. These are indicated in the table below:

Table 3.15. Comparison of the Port Talbot Survey with the MORI survey

Factor	Port Talbot	MORI
Importance of temperature control in preventing FP	80	85
Knew recommended temperature for refrigerator	27	12
Had a thermometer in their refrigerator	29	27
Use a cool bag/box to carry frozen and chilled foods home	5 (fr) 1 (ch)	8
Always read manufacturers instruction	27	>50
Thought manufacturers should provide information	N/A	70
Thought manufacturers were providing information	N/A	34

3.7. Conclusion

The results of the survey indicate there is a gap in the public's knowledge of food hygiene. In particular, in relation to the following:

- The range of premises that have been implicated in outbreaks of food poisoning and in particular the home
- What the consumer can do to prevent food poisoning in the home
- Foods that are "high risk" especially soups, stews and gravies and the care needed in preparing, cooking and storing such foods to prevent food poisoning

- The use of microwaves for thawing, cooking and reheating food and the need to follow manufacturers instructions including standing times after cooking
- The need to completely thaw frozen foods under refrigerated conditions. Precautions to be taken when thawing foods to avoid cross contamination
- The need for thorough cooking, quick cooling and refrigerated storage when preparing foods in advance
- The need to carry chilled and frozen foods home in insulated containers after shopping
- The correct way to store food in the refrigerator to avoid cross contamination
- The correct temperature at which to operate the domestic refrigerator and the need to check this temperature frequently

The investigation into where people would go for information referred to earlier in this chapter found the information available at these places to be less plentiful. It is possible respondents felt these were the places they should go for reliable information, whereas the information provided by retailers, manufacturers, producers and the media is not seen to be so reliable, albeit plentiful. Information provided by the latter groups is sometimes seen to be biased towards the product or industry, or in the case of the media, sensationalised.

It is also possible that environmental health departments, doctors/health centres and health promotion units are places where people would go for information once they or a member of their family had experienced food poisoning i.e. information seeking is reactive rather than proactive. It would also appear that there is a need for a complete rethink about how the general public is educated about food hygiene.

Educational campaigns should focus on long term problems i.e. temperature control, effective use of technology, correct handling of new products and should explain why preventative actions are necessary, so as to motivate the food handler.

The message should be simple and continually reinforced. In addition, as an apparent lack of knowledge is linked to equipment used in the kitchen, manufacturers of this equipment should become involved in this education process.

Chapter 4 will look at the way the mass media provides food safety information and how their role can be best utilised in promoting good hygiene practices.

Chapter 4

Sources of Knowledge – The Mass Media and Food Hygiene

4. SOURCES OF KNOWLEDGE - THE MASS MEDIA AND FOOD HYGIENE

4.1. Introduction

In this chapter the role of the mass media in providing accurate food safety information to the public, is examined by use of structured audits.

It is impossible to formulate a strategy for health education, which would include the use of the mass media, without first knowing where people get their information, the effects of the mass media, and how influential it may be in changing behaviour.

This information will be used to formulate a strategy for health education campaigns, which could utilise the media to disseminate information to a wider audience.

4.2. Background

The information gained from a review of previous surveys presented in Chapter 2 (Section 2.10.) suggests that people obtain their information from various sources, some of which were identified as sections of the mass media.

This was endorsed in the Port Talbot survey discussed in Chapter 3 (Section 3.4.14.) and illustrated in Table 3.12.

Very often unless a specific problem occurs people do not go looking for information but we do absorb a lot of information in our day to day lives, from what we read and what we observe: the power of imitation having been noted over several decades (Jones and Weimer 1977).

The use of the mass media can therefore be beneficial in health education and can serve to inform people to adopt hygienic practices for food preparation (Ackerley 1994).

The media permeates everyday life, reaching the majority of the population by one or several modes of communication. The media do not simply entertain, although they

do provide a leisure activity. By virtue of their attracting such large audiences the mass media are a primary source of information and influence (Research Unit in Health and Behaviour Change 1995).

Audiences are not passive receivers of media messages. They cannot easily be duped or manipulated; however there are serious implications for the success of campaigns, which employ the mass media, and, at least, partially this explains the lack of success of health education programmes aimed at mass audiences. People actively interpret what they see and hear: they select, reject, make judgements and discuss issues raised by the media.

Changes in attitudes and behaviour if they do occur are likely to do so only after a period of resistance and contemplation. Thus, it is always difficult to attribute them solely to the media (Research Unit in Health and Behaviour Change 1995).

Different components of the mass media including television programmes, magazines and cookery books available in the Port Talbot area were audited over a six-month period. This chapter brings together the findings of that audit and looks at the ways the mass media may be better utilised to bring the food safety message to the public.

4.3. The Meaning of Mass Media

The two main elements of mass media are the mass audience and the fact there is normally no interpersonal communication between the originator of the message and the mass audience. It is the large audience that is attractive to the communicator. The advent of radio and television has increased the possibility of reaching an even larger audience and of changing their habits at both national and even international level.

In interpersonal communication it is possible to target the message to the receiver in the form most appropriate to achieve the desired learning outcome. Mass media may stimulate some of the features of this communication process dependant on the attributes of the presenter. However, without feedback from the audience it is impossible to know whether the audience has even understood the various messages let alone acted upon them.

There is therefore a need for the integrated approach, to explore how the communicator can develop interpersonal skills to work through the media.

Mass media vary considerably in their potential and capabilities. Leaflets and posters are substantially different from television and radio (Ewels and Simnet 1985).

The present study looked at various aspects of the mass media in an attempt to determine the amount of knowledge available, in this way, to the general public.

The media have been shown to be important sources of information for the public about food and nutrition (Kraft 1978, Turner 1984). Research has shown that one aspect of the media, women's magazines, has a particularly strong influence (Bull 1985, McCluney 1988, National Dairy Council 1990).

Traditionally women's magazines have given nutritional advice, but could provide a valuable source for food safety information and will be examined in this study.

4.4. General Approach to Data Collection

The information gained from the Port Talbot survey, and discussed in Chapter 3, on where people would go to obtain information on food safety has been used as the basis of this part of the study which was to look at several sources of information received via the mass media and the effect this may have in changing people's approach to food safety.

4.4.1. Sources of Information

The Port Talbot study identified places that respondents could go for information on food hygiene – Table 3.12. The most frequently cited was the environmental health department, followed by the doctor/health centre, health promotion unit and supermarket. Information provided in each of these places would be in the form of leaflets. It was therefore decided to include leaflets as one of the areas of study. Next came newspapers/magazines, cookery books, library (which would provide, as well as specialised textbooks, leaflets and cookery books), school/college (which would provide similar to a library) and friends/relatives who would only provide verbal advice or information obtained from one of the above sources.

The MAFF study of 1988 also indicated that magazines and cookbooks would and had been used by consumers as sources of hygiene information. It was therefore decided to include newspapers, magazines and cookbooks in the study.

In addition it was decided to include television cookery programmes, they are popular viewing, shown at peak times and can convey information to the media through sight as well as verbally. Five different sources of information were therefore selected from those identified namely:

1. national and local press
2. leaflets
3. magazines
4. cookery books
5. television

These are all readily and easily available to all sections of the public at large.

4.5. National and Local Press

4.5.1. Method

Over a period of six months national and local press was surveyed to ascertain what information on food safety they contained.

In order to determine which were the most appropriate newspapers, contact was made with the largest newspaper vendor in the area and enquiries were made in order to ascertain which newspapers were readily available in the area and which were the most popular both local and national.

The local newspapers chosen were:

1. The Port Talbot Evening Post, available Monday to Saturday and
2. The Port Talbot Guardian available weekly

The national newspapers chosen were:

1. The Daily Mirror available Monday to Friday
2. The Sun available Monday to Friday
3. The Saturday Telegraph and
4. The Sundav Times

The local newspapers were chosen as being the most popular available in the Port Talbot area.

The national newspapers were chosen to give a representative sample of both the tabloid and broadsheet press, and in accordance with the Joint Committee for the National Readership Surveys (JICNARS) which gives a profile of the readership of each of Britain's national newspapers, see below:

Table 4.1. Profile of Readership - British National Newspapers

Newspaper	Readership 000's	% of socio-economic group					
Popular		I	II	IIIa	IIIb	IV	V
Sun	11717	5	10	20	35	38	26
Mirror	9952	7	10	18	29	31	20
Mail	5021	18	16	15	10	8	6
Express	4910	12	13	15	11	9	7
Quality							
Telegraph	2798	29	17	8	2	2	1
Guardian	1435	7	9	5	1	1	1
The Times	1245	17	8	3	1	1	<1

Joint Committee for the National Readership Surveys (JICNARS)

Prior to conducting the assessment a checklist was drawn up (Appendix 2). Criteria were used to assess the inclusion of information on food safety whether it be the inclusion of articles directly regarding food and food preparation including recipes; reporting of a scare or food poisoning outbreak; or the inclusion of preventative measures for the information of the reader, such as thorough cooking, correct storage and good hygiene practices. If these were included it was scored as a "yes" on the checklist for each of the issues. It was also decided to look at the inclusion of healthy eating issues and the depth of coverage to compare the amount of coverage given to these issues as opposed to those of food safety. The assessment was conducted by carefully scrutinising the material and recording what information was contained therein on the checklist. As the assessment of the information contained was subjective on the part of the assessor, all assessments were carried out by three people separately. The assessments were then compared for reliability. In all cases the results were found to be the same.

4.5.2. Results and Discussion

During the six-month study period a total of 480 newspapers were examined and the following data obtained:

Table 4.2. Food Safety Information in Local and National Newspapers studied

Number of newspapers containing information on food safety	23	5%
Degree of Information Provided		
Brief (mentioned food safety in an article on a food scare etc)	21	4%
Adequate (mentioned food hygiene in an article)	2	0%
Comprehensive (included detailed food hygiene information)	0	0%

Number of newspapers containing information on healthy eating	332	69%
Degree of Information Provided		
Brief (mentioned food safety in an article on a food scare etc)	63	13%
Adequate (mentioned food hygiene in an article)	64	13%
Comprehensive (included detailed food hygiene information)	205	43%

Number of newspapers containing information on food poisoning outbreaks	97	20%

Number of newspapers containing information on food scares	42	9%

Number of newspapers containing information on preventative measures for food poisoning	9	2%

Number of newspapers containing information on thorough cooking	5	1%

Number of newspapers containing information on the importance of refrigerated storage	1	0%

Number of newspapers containing information on good hygiene practices	7	2%

The results indicate newspapers generally neglect to provide information on food safety, concentrating on reporting outbreaks of food poisoning instead of prevention. When information was provided on good hygienic practices, it was provided within a report on an outbreak of food poisoning, and not as a separate article. Healthy eating was much better reported, indicating the publisher believes the public has an interest in food matters, but in general little or no information was provided on the safe preparation of food.

4.6. Leaflets

4.6.1. Method

Over a two-year period a survey of food safety leaflets available to the public was carried out. This was conducted by visiting premises within the borough to which the public have access and which provide leaflets.

This included:

- Local authority buildings – i.e. council offices, leisure facilities, libraries and community centres; here were found the widest range on leaflets which included the Food Sense range, the "Food Safety Advisory Centre" (FSAC) leaflets and the Food and Drink Federation (FDF) leaflets published during its Foodlink Food Safety Week Campaign. All leaflets were colourful, well presented and contained food safety information.
- Health centre – this included the "Food Sense" series, which was introduced in 1991 by MAFF and is added to, as issues become important to the consumer. These included leaflets on Food Safety, Food Additives, Understanding Food Labels, Food Protection, Healthy Eating, Microwave Cooking, and Chemicals in Food.

- Health promotion unit - again included a plethora of leaflets akin to local authority buildings probably obtained from the same source.
- Supermarkets - included here were leaflets specific to the supermarket and also those produced by the Food Safety Advisory Council (FSAC). The supermarket guides tend to include general information whilst the FSAC material also targets single topics at a time including: food irradiation, genetic engineering, nutrition, food labelling in the European Union and safe food. The FSAC also publish a book entitled "Food Safety Questions and Answers". This is a reference book for the general public and gives comprehensive answers to questions that may be asked by the consumer. The FSAC also operates a freephone "Foodline" service with the number being published on the back cover of the book to enable the consumer to pose any additional question.

The leaflets were examined against a predetermined set of criteria (Appendix 3) on a yes/no basis, which included:

- ease of availability – were they easily accessible, on general display and in premises normally frequented in the course of their day to day activities
- presentation of information – were they attractive and presented so as to be easily understood, was the text interspersed with diagrams, pictures etc.
- ease of reading – was the text easy to read, large enough and well spaced
- simplicity - was the text kept simple and to a minimum so as to be easy to understand and not confuse the reader
- lack of jargon – were any technical terms or jargon included
- item specific –was the leaflet specific to one aspect of food hygiene or was it general

4.6.2. Results and Discussion

It is valuable to consider the importance of leaflets, as a component of the mass media, because the initial health education response to the food scares of the late 1980s was to produce leaflets. Food safety/hygiene leaflets were produced by a variety of agencies including supermarkets, the government and trade organisations. They were and still are widely available. It is difficult to determine if any evaluation has been performed concerning the effectiveness of these food safety leaflets. Information obtained from previous campaigns suggests leaflets have only a limited value and that mass distribution is not an effective method of health education (Spencer 1984, Nichols et al 1988). In the Moore study of 1992, 57% of the sample could not even remember receiving the leaflet. Of those that could remember receiving them, 72% found them unacceptable. This illustrates great care must be taken in design and production. The message must be accurate, non-technical, clear, impinge on the consciousness of the consumer and be both appropriate and believable.

During the present study period 44 leaflets were examined and the following data obtained:

Table 4.3. Analysis of Leaflets

Criteria	Number	%
Easy to obtain	41	93
Containing well presented information	39	89
Containing easy to read information	44	100
Containing information easy to understand	44	100
Containing jargon	2	5
Non technical	44	100
Item specific	17	39

There is a plethora of leaflets available to the general public from a variety of sources and these are easily obtained during the course of their day to day life i.e. shopping, visiting the doctor, library, or civic centre. Whilst it was an easy task to assess their availability it is far more difficult to determine their effect on behaviour. Leaflets are an excellent medium to reinforce information given, but on their own are limited. The number of leaflets issued per annum in the Port Talbot area from the above sources runs into tens of thousands. Therefore it would appear that there is no lack of information being distributed. Also the information contained in the leaflets was varied and related to all areas of food safety and could enable people to change their behaviour in respect of food hygiene practices if they were so motivated.

All leaflets examined were attractively presented and very clearly laid out. A nice approach is to have a booklet specifically dedicated to a single topic thus allowing the reader to tackle one issue at a time. However, it is impossible to assess the amount of knowledge that the public have gained from the leaflets.

What is known is that in the twelve months after leaflets became widely available in England and Wales the reported incidence of food poisoning increased 23% and campylobacter increased 18% (Steering Group on the Microbiological Safety of Food 1993). It is possible without leaflets the increase would have been even greater. The magnitude of these increases suggest mass distribution of food safety leaflets, in isolation, has only limited value. Perhaps the real value of such leaflets lies in their combined use with other strategies especially those containing interpersonal support (Tones et al 1990).

4.7. Magazines

4.7.1. Method

Over a six-month period the top ten selling magazines in Port Talbot were surveyed to assess the level of articles they contained which dealt with aspects of food safety. In order to determine which magazines were to be assessed i.e. the ten most popular in the area, visits were made to all newsagents in the area. They were asked which were the most popular magazines sold from their premises.

It was noted that this varied in different areas of the borough. The following table lists the most popular selling magazines in each of the areas within Port Talbot.

Table 4.4. Top selling magazines in areas of Port Talbot

Sandfields	Margam	Baglan	Valleys	Town
Bella	Bella	Bella	Bella	Bella
Best	Best	Best	Best	Best
Me	Woman	Woman	Me	Me
Chat	Woman's Own	Woman's Own	Chat	Chat
Prima	Cosmopolitan	Take a Break	Take a Break	Take a Break
				Woman
				Woman's Own
				Woman's Weekly
				Woman's Realm
				Health and Fitness
				Top Sante
				Slimming

The above magazines were purchased and assessed by use of a checklist (Appendix 4). The checklist included those features considered to be the basic knowledge required by members of the public in preparing food (International Commission on

Microbiological Specifications for Foods (ICMSF) 1988) i.e. thorough cooking, storage and good hygiene practices. In all 30 magazines were examined from the above list, two of each plus one Television magazine and one Sunday magazine.

4.7.2. Results and Discussion

There is considerable evidence to suggest that magazines are perceived as a valuable source of information on food and health. A study of women's magazines and their influence on nutritional knowledge and food habits (Moore et al 1992) ranked magazines as the most important source of information. They also scored highly in the MAFF survey (MAFF 1988). More importantly in the study discussed in chapter 3, 46% of the people living in the Port Talbot area stated they would consult magazines for information on food safety and hygiene.

All 30 of the magazines surveyed contained recipes, several of which were geared towards healthy eating. Health topics in general were included from information about specific illnesses to healthy living styles. All included articles on beauty and looking good. Several contained information on shopping but few contained advice on food safety.

The results are presented below:

Table 4.5. Hygiene Information in Women's Magazines

Attribute	Number	%
Information on food safety included	5	20
Importance of thorough cooking mentioned	2	6.6
Importance of refrigeration mentioned	1	3.3
Information on bacteria/food poisoning included	0	0
Importance of personal hygiene mentioned	0	0
Importance of general hygiene mentioned	0	0
Importance of cooling food post cooking mentioned	0	0

The results indicate women's magazines, which often contain recipes and articles on food are a wasted health education resource.

Few contained information on food safety and where information was available it was brief and inadequate. Recipes can be a very precise mechanism for conveying information on specific hazards and risks associated with food (Zottola and Wolf 1981). Such magazines with a little more thought could advocate and reinforce the food safety message.

4.8. Cookery Books

4.8.1. Method

Over a 12-month period a survey of the best selling cookery books in Port Talbot was carried out. Visits were made to local booksellers to assess which were the most frequently purchased cookery books in the area. The top 20 best selling cookery books were then examined and assessed by means of a checklist which included criteria based on the basic knowledge on food hygiene required by the public (ICMSF 1988) – (Appendix 5).

This included such topics as food safety, food poisoning and refrigerated storage.

4.8.2. Results and Discussion

Cookery books are a national source of information on food, recipes and meals. Cookery books were seen as a useful source on information on food safety by the participants on the MAFF study of 1988 and 43% of the participant in the knowledge survey undertaken in the Port Talbot area and discussed in chapter 3 indicated they would consult cookery books for advice on food safety/hygiene. Other studies have suggested that cookery books are the principal source of recipes ((McKie and Wood 1992).

The results of this survey of cookery books are presented below:

Table 4.6. Hygiene Information in Cookery Books

Attribute	Number	%
Information on food safety	4	20
Information on bacteria and food poisoning mentioned	3	15
Importance of refrigeration mentioned	2	10
Importance of personal hygiene in preparation mentioned	2	10
Importance of cooking in relation to food safety mentioned	0	0
Importance of general hygiene in preparation mentioned	0	0
Importance of appropriate cooling after cooking mentioned	0	0

Cookery books are a logical source of information on recipes with many people turning to them before preparing food, and as such could be a source of precise food safety information and appropriate control measures.

The results indicated that they are a missed health education opportunity with respect to food safety, with only 20% containing even generalised information, such as cooking temperatures, and in those that did contain information, the reason why was not explained. Health education messages having a higher success rate if the respondent understands and comprehends the message (Tones, Tilford, and Robinson 1990, Downie, Fife and Tannahill 1990).

4.9. Television

4.9.1. Method

Over a six-month period a survey of television cookery programmes was carried out. The programmes were videotaped and later audited for information and practices in relation to food safety (ICMSF 1988, Griffith and Worsfold 1994).

A hygiene audit form was constructed to analyse "active" and "passive" food safety messages contained in the programmes (Appendix 6). Active messages were defined as specific food safety advice mentioned by the chef during the preparation, an

example of this would be the chef stating the need to use different knives when cutting raw and cooked foods to avoid cross contamination. Passive messages were food safety practices, which had been visible, to ensure the food was prepared hygienically; an example of this would be the chef being seen to use different knives on raw and cooked foods but not stating why.

The recordings of the television programmes were played back and audited using the prepared forms.

Twenty-five television cookery programmes were audited in all including two full series of cookery demonstrations broadcast over a period of weeks. The practices audited covered basic knowledge and control measures deemed to be required by the public in preparing foods (ICMSF 1988, Griffith and Worsfold 1994).

4.9.2. Results and Discussion

The potential use of television to convey food safety information has previously not been evaluated even though a variety of food related programmes, many containing recipes, are to be found on all the channels. People also learn from television by copying good practice that they see in adverts and programmes. Televisions and radio was ranked second in order of importance as a source of information on food and nutrition (Moore et al 1992). It has been stated that television is an important agent of socialisation and in some degree reflects prevailing cultural values (Manstead and McCullock 1981). If good food hygiene is highly valued then this should be reflected in television programmes.

The results of the audit of television cookery programmes are presented below:

Table 4.7. Hygiene Audit of Television Programmes

Attribute	Number	%
Good personal hand habits shown or mentioned	19	76
Hygienic use of equipment shown or mentioned	19	76
Cooking times and temperatures provided	19	76
Correct handling of dish during serving shown or mentioned	17	68
Protective clothing worn	17	68
Separation of raw from cooked foods shown or mentioned	14	56
Mention of need for adequate cooking	7	28
Refrigerated storage of high risk foods shown or mentioned	3	12
Control measures for checking adequate cooking mentioned	2	8
Adequate cooling of pre-prepared foods shown or mentioned	1	4
Evidence of availability of cleaning materials	0	0
Use of cleaning materials shown or mentioned	0	0
Need for hand-washing shown or mentioned	0	0
Need for refrigeration of cooked foods shown or mentioned	0	0
Information given on re-heating of dished	0	0

The hygiene message "projected" on the programmes was variable, some practices such as good personal habits were found in the majority of programmes (76%). Other practices, such as the need for thorough cooking, proper cooling and storage after cooling, all known to be critical points in domestic food preparation (Griffith and Worsfold 1994) were poorly dealt with or ignored. Similarly practices designed to eliminate cross contamination including handwashing and the need for correct cleaning after handling raw foods were not mentioned or shown. In the latter case the materials necessary, e.g. sanitisers, were not visible or apparently available. This was

of concern when in most instances raw foods had been used in recipes. In many instance negative messages were conveyed to the audience, e.g. the chef wiping his hands on his apron after handling raw meat, using the same chopping board of raw and cooked foods, using raw eggs, wiping the edge of the plate, prior to serving, with the chefs cloth.

Television possesses advantages over other media forms for the presentation of food hygiene information. Food hygiene is partly knowledge and partly skills based and television can be especially suited to demonstrating good skills and practices. Furthermore the presenters are often people of "prestige" who have popular appeal and for whom the public have a liking. These factors can be important in the success of transmitting health education messages by affection the individuals focus of control (Tones 1987) and normative beliefs (Ajzen 1991). It is therefore of some concern if a television cookery personality not only does not have good practices but actually demonstrates bad practice. This transmits the opposite message concerning the value of food hygiene to the consumers.

Other advantages of television are that it can reach a wider audience, including those on low incomes and of lower educational standards as well as creating a feeling of interpersonal involvement (Downie, Fife and Tannahill 1990).

Television programmes can be very useful in health education (Tones, Tilford, and Robinson 1990) especially if they were to be used in combination with other strategies or methods for hygiene promotion, yet with respect to food safety their potential is relatively unrealised although television does much to advocate and emphasise the healthy eating message. To date only one television series has been dedicated to educating the consumer concerning the issue of safe domestic food preparation.

4.10. Overall Conclusions and Recommendations

Health Education is about enabling and supporting people to set their own health agendas that they can then implement (French 1990). The mass media can have a particular impact where people are already motivated to change (Tones 1987). The impact of the mass media upon food hygiene may be greater than in other areas of health education simply because safe food preparation does not deprive the consumer of pleasure or involve the consumer suffering as in other health issues (e.g. dieting). Assuming that domestic food safety education is of value, although it is not mentioned in relation to food health promotion in Wales (Howson 1993), then there are messages to be communicated.

People are bombarded daily with a mass of information but only a small proportion is retained or remembered (Downie, Fife and Tannahill 1990). The way in which the information is presented is extremely important in determining how successfully the message will be received. The use of the mass media can be very successful in communicating health information and in changing people's attitudes towards the subject, in establishing beliefs and in promoting the conviction that consumers do have the power to control their "good" health. These are important if people's food hygiene practices are to be changed (Ackerley 1994).

The advantage of using the mass media is that they reach a large audience, the disadvantage is that it lacks interpersonal communication. Of the media formats television can reach the largest potential audience and has the greatest degree of interpersonal communication.

Elements of the mass media are keen to report food safety scares but their use as a vehicle for food safety education seems to be ignored. Cookery books, magazine articles and recipes and television food programmes are already in existence. With no extra expense they could be modified to advocate and reinforce the food hygiene

message. Campaigns such as the Foodlink initiative have a role to play but they are only one week of the year and require capital investment. Use of the mass media would require no extra capital investment, could be employed throughout the year and would undoubtedly reinforce the message of other campaigns such as Foodlink. There is a temptation to look upon the mass media as a means of solving problems that affect the mass of people (Downie, Fife and Tannahill 1990), although this would be over simplistic. Nevertheless the mass media have a role to play in food safety education which is not currently being fulfilled.

Therefore the following recommendations are made:

- Cookery books and magazines should include basic information on food hygiene.
- Recipes in books, magazines and on television should contain basic food hygiene information relevant to the recipe (Griffith and Worsfold 1994).
- The mass media should recommend the use of food hygiene leaflets.
- Food preparation on television should be carried out hygienically and illustrate good practice (Griffith and Worsfold 1994).

The media have a responsibility to ensure that advice they give is accurate and adequate. Editors, publishers and producers should consult with the appropriate professional bodies. The Foodlink initiative is a good example of co-operation in food hygiene education and the philosophy should be taken up by all involved with food including the mass media.

Chapter 5

The Food Safety Beliefs of Residents of the Borough of Port Talbot

5. THE FOOD SAFETY BELIEFS OF RESIDENTS OF THE BOROUGH OF PORT TALBOT

5.1. Introduction

This chapter assesses the food safety beliefs of adults in the Port Talbot area. These beliefs will then be compared with the literature in the area and in particular with the general beliefs identified in the knowledge survey discussed in Chapter 3 and also with a similar study undertaken to assess the food safety beliefs of children and young adults in South East Wales (Mullen 1998). Further the results of this survey will be considered in light of the food preparation practices identified in Chapter 3 to consider the possible effect that incorrect beliefs could have on the production of safe food.

Several of the surveys previously conducted have looked at the food hygiene practices of the respondents (see Chapter 2), including the survey undertaken and discussed in Chapter 3. In all of these surveys questionnaires were used which presented the respondent with a list of factors from which to choose. This implies that all factors included were in some way connected to food hygiene and were therefore not incorrect, therefore it was impossible for the respondent to be wrong. Also the order in which the factors were listed may have influenced the response. Again by presenting the respondent with a list of factors their own practices may not be identified: only those listed in the questionnaire.

There has been very little research into what peoples beliefs' about food hygiene are, although we know that beliefs influence behaviour (Gross 1995). This study was therefore designed to build on the information already gained from the survey conducted and discussed in Chapter 3 to assess beliefs using a free form statement. This would enable the collection of data, which would both avoid the imposition of bias from the type of practices listed above and which could also be compared to data

collected in other studies. The results of this chapter together with those of the studies undertaken in Chapter 3 - consumer food hygiene knowledge and practices, and Chapter 4 - the role of the mass media, will be used to formulate an attitude survey, presented in Chapter 6.

5.2. Background

Gross in 1995 stated that beliefs represent the knowledge of information we have about the world (although they may be inaccurate or incomplete) and, in themselves, are non-evaluative. According to Fishbein and Azjen (1975) "a belief links an object to some attribute". To convert a belief into an attitude, a "value" ingredient is needed, which by definition, is to do with an individual's sense of what is desirable, good, valuable, and worthwhile. Whilst most adults will have thousands of beliefs, they have only hundreds of attitudes and a few dozen values (Gross 1995).

Beliefs are in themselves neutral, whereas values, by definition, are not: they provide standards and motives, which guide our actions towards achievement of those values. There has been considerable debate about the factors responsible for the rise in food poisoning and the role of government, industry and consumers in food safety as discussed in Chapter 2 (Mosell 1989, Guardia 1990, van Schothorst 1991). The two main approaches to reducing the incidence of food poisoning are legislation and education (Gilbert 1983, Todd 1989). The aim of legislation has been to get the food industry to produce safe food. Whilst this may have been achieved, the number of cases of food poisoning continues to rise every year.

The second approach, favoured by Gilbert (1983), is consumer education; this has received relatively little attention (Miller 1990) despite the fact that over 80% of notifications of outbreaks of food poisoning relate to the home (Communicable Disease Report 1991, PHLS/CDSC 1993).

One possible explanation for the lack of effort and investment in this approach may be the lack of an objective mechanism for assessing its success. It is relatively easy to identify consumer knowledge of food safety but this is very different from assessing consumer behaviour (Griffith et al 1994). There appears to be a lack of information in consumer food handling behaviour, an area that requires further research.

The potential benefits of a HACCP approach in the home have been reviewed (Griffith and Worsfold 1994) and its use in health education recommended by Bryan (1992). Knowledge of the beliefs that people hold in respect of food hygiene could therefore be of value in determining a strategy for food hygiene health education for local authorities which could lead to a change in behaviour and ultimately a reduction in the number of food poisoning cases reported per annum. In order to develop this further more information is needed of the food safety beliefs of the consumer.

5.3. Aims

The aim of this part of the study was to assess the beliefs of the residents of Port Talbot with regard to food safety.

5.4. Method

A questionnaire was designed to assess people's beliefs in their ability to influence the safety of the food they consumed by asking them what were the six most important things they felt that they could do to make food safe to eat. In the interests of gathering the maximum possible amount of information from this survey, an open question was asked, which enabled the respondents to return information, which corresponded more closely to their actual beliefs, whether based on correct knowledge or not. A closed question would have restricted the respondents to those

replies, with which the author deemed it likely that they would agree. This could have led to biased responses and prevented their true beliefs being recorded.

It was decided that since the results of this survey would be used to form a health education strategy, it was more important to gather detailed information (using an open question) than to gather information easier to analyze (using a closed question). The question was designed to be unambiguous and give the respondents sufficient information for a relevant response.

The question the respondents were asked was:

If we do not eat we will starve and die. Sometimes however, the food we eat makes us sick. Please list the six most important things that you think you can do to make food safe to eat.

To obtain a similar response rate to the survey previously carried out and discussed in Chapter 3, the whole borough was targeted. This would produce a stratified sample, in which all socio-economic groups living in the target area would be investigated. Each twentieth house in the borough was visited by the author. The person answering the door was asked if they prepared food and, provided that they prepared food more than once a week, they were asked to contribute to the survey. If the person answering the door did not prepare food and the person who did prepare the food in that property was not available the author moved on to the next twentieth house.

By using this approach, one hundred and eight questionnaires were completed, however not every respondent listed six items. Several listed four or five, with some only listing three. The questionnaires were then analysed to determine what those who prepare food in the home felt that they personally can do to ensure that the food they prepare is safe to eat.

5.5. Results and Discussion

Analysis of the data was carried out manually. A total of 108 subjects participated in the study. A breakdown of the gender, age and occupation of the participants are provided in the following tables:-

Table 5.1. Gender of Respondents

Male	27
Female	81

Table 5.2. Age of Respondents

Age	Number	Male	Female
<25	20	3	17
25 – 40	32	7	25
40 – 60	47	10	37
60+	9	0	9

Table 5.3. Occupation of Respondents

Occupation	Number
Housewife	30
Professional	13
Tradesperson	22
Labourer	22
Retired	17
Student	3
Unemployed	1

A total of 32 items were included in the responses. The number of times that respondents mentioned each factor was recorded. The following table lists the number of respondents including that item in their list and the percentage of respondents that listed that item:

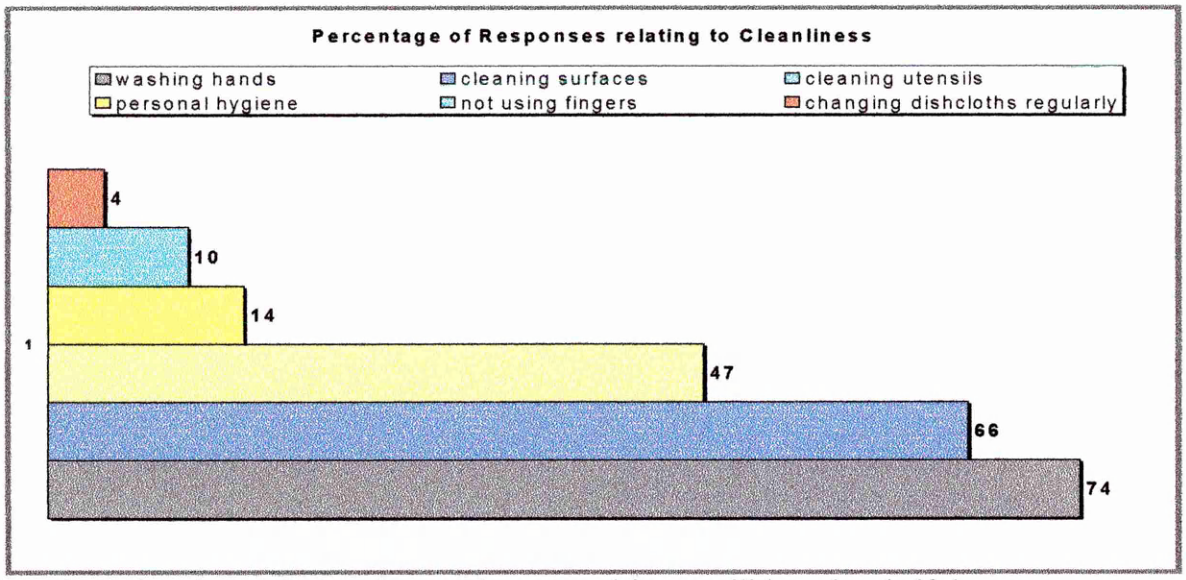
Table 5.4. Full list of Responses

Item	Number	Percentage
Wash hands	80	74
Clean surfaces	71	66
Cook thoroughly	52	48
Clean utensils	51	47
Store correctly	49	45
Buy fresh	49	45
Store raw/cooked separately	46	43
Fridge/freezer operating correctly	25	23
Keep covered	24	22
Wash vegetable and fruit	24	22
Personal hygiene	16	14
Defrost thoroughly	16	14
Colour coded equipment	12	11
Cool correctly	11	10
Insect control	11	10
Not using fingers	11	10
Protective clothing	10	9
Not smoking	8	7
Animals	6	6
Buy good quality	5	5
Not coughing/sneezing over food	5	5
Check appearance	5	5
Keep food hot	5	5
Cover cuts	4	4
Change dishcloths regularly	4	4
Not storing too long	4	4
Disposable gloves	3	3
Bins having tight lids	2	2
Jewellery	1	1
Discard leftovers	1	1
Fresh water in the kettle	1	1
Avoid cheap ingredients	1	1

The most frequently occurring response related to the washing of hands, with 80 people (74%) including this in their top six preventative measures that can be used to ensure food is safe to eat.

233 responses related to cleanliness - washing hands (80 (74%)), cleaning surfaces (71 (66%)), cleaning utensils (51 (47%)), personal hygiene (16 (14%)), not using fingers (11 (10%)), and changing dishcloths regularly (4 (4%)).

Figure 5.1. Percentage of Responses relating to Cleanliness

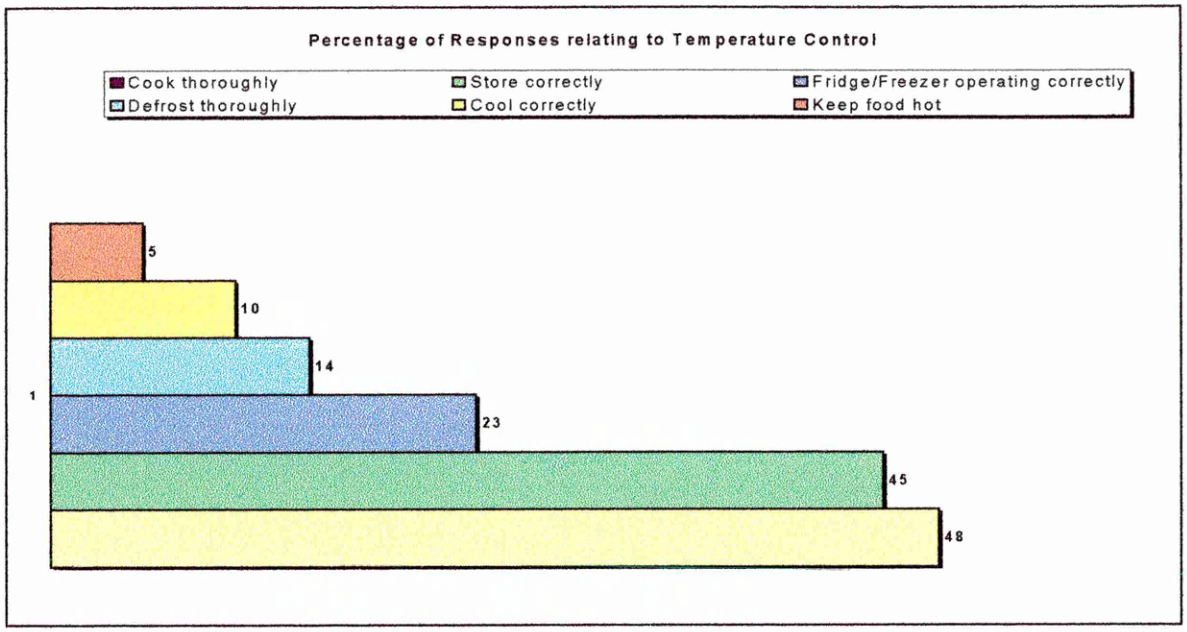


Despite being the third most frequently reported factor still less than half the respondents considered cooking thoroughly (52 (48%)) to be something they could do to make food safe to eat.

49 (45%) listed storing correctly, 25 (23%) ensuring the temperature of fridge and freezer was operating correctly, 11 (10%) identified cooling correctly, 16 (14%) defrosting thoroughly and 5 (5%) keeping food hot as being important. This may indicate a lack of knowledge of temperature control, an area that had previously been identified in the survey discussed in chapter 3.

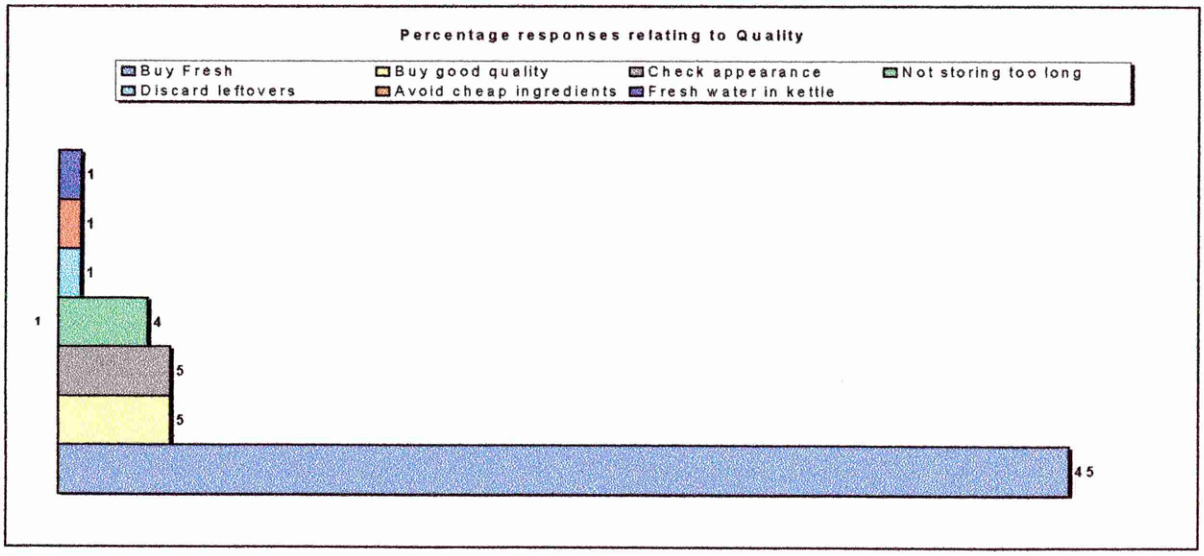
The following chart shows the percentage of responses relating to temperature control:

Figure 5.2. Percentage of Responses relating to Temperature Control



49 (45%) respondents thought buying fresh food to be important. However only 5 (5%) thought the quality of the food purchased to be of relevance with only 4 (4%) identifying not storing food for too long and 1 (1%) avoiding cheap ingredients a factor of no real relevance to the safety of the food. Only 5 (5%) felt it important to check the appearance of the food. The following chart identifies the percentage of responses relating to quality:

Figure 5.3. Percentage of Responses relating to Quality

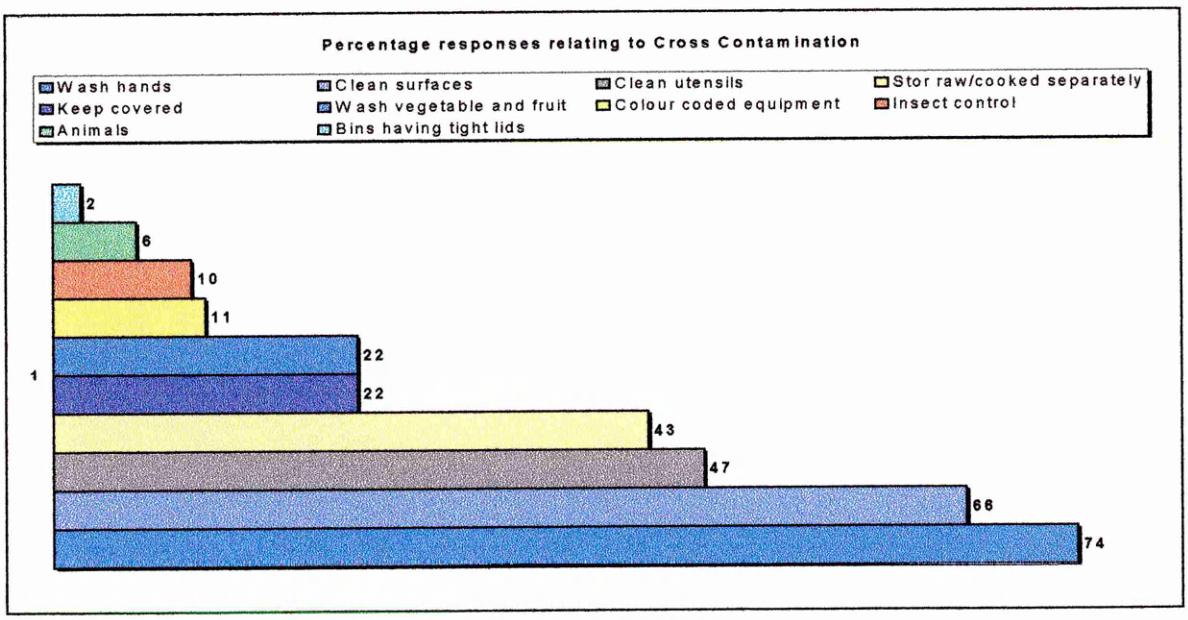


Only 46 (43%) listed storing raw and cooked food separately with 24 (22%) feeling it important to keep food covered. 24 (22%) identified the washing of fruit and vegetables, 12 (11%) the use of colour coded equipment, 8 (7%) smoking, 4 (4%) covering cuts and 3 (3%) the use of disposable gloves These results again indicate a possible lack of knowledge of the correct storage of food and the concept of cross contamination.

Insects and pets, whilst known carriers of pathogenic bacteria, were only identified by 11 (10%) and 6 (6%) respondents respectively, another area of concern considering the amount of domestic premises who now have pets. Similarly only 2 (2%) identified the need for tight lids on refuse bins.

The following chart shows the percentage of responses relating to cross contamination:

Figure 5.4. Percentage of Responses relating to Cross Contamination



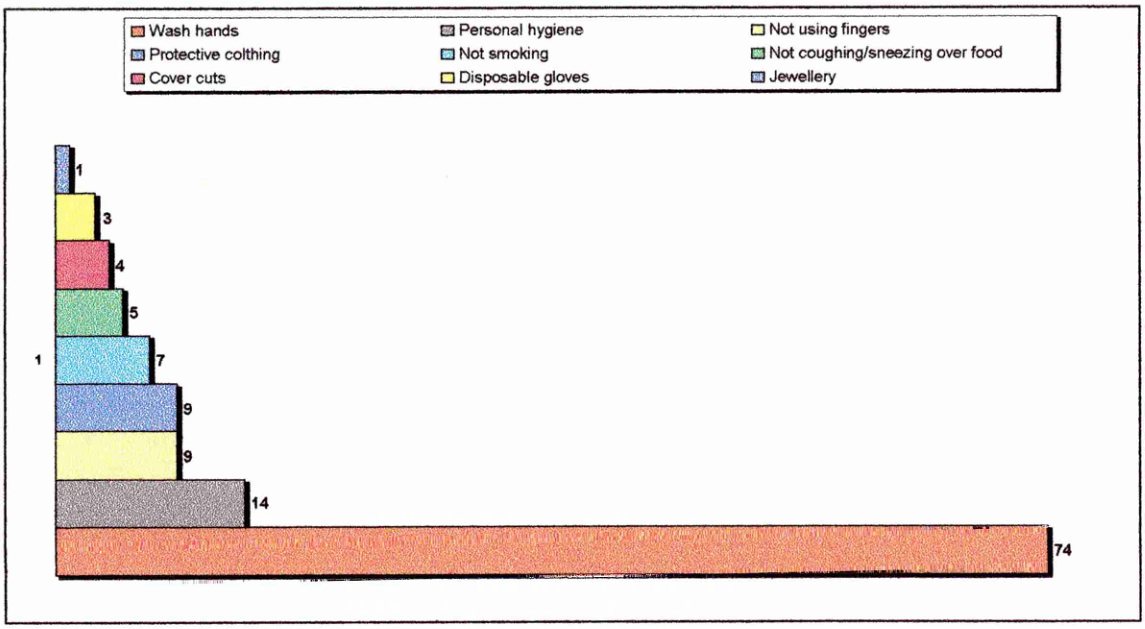
Only 1 (1%) person thought the wearing of jewellery important in food hygiene, the reason for this inclusion is not known. The respondent may have acknowledged the

possibility of physical contamination and/or may have realised the possibility of bacterial contamination, thereby identifying the removal of jewellery as something they could do to ensure food safety. 10 (9%) identified the wearing of protective clothing, 5 (5%) listed not coughing/sneezing over food and 1 (1%) felt discarding leftovers to be important. All known important factors in food safety.

In addition 1 person (1%) felt it important to use fresh water in the kettle. It cannot be verified as to why this was included, it may be that it was something this person always did or it may be that they perceived a risk from stale or stagnant water. As this water is going to be boiled, any risk would obviously be abated.

The following chart shows the percentage of responses that related to personal hygiene:

Figure 5.5. Percentage of Responses relating to Personal Hygiene



The main items identified by respondents are all included in the teaching of basic food hygiene a practice now carried out by environmental health departments and educational establishments nationwide.

The most important factor the residents of Port Talbot believed would avoid food poisoning was cleanliness, both personal with regard to hand washing, and also that of the premises and equipment. What must be remembered however it is not just one factor that causes food poisoning but a combination of factors, e.g. cross contamination, undercooking, storage at ambient temperature.

Roberts in her study of 1982 identified the factors, which contributed to 1479 outbreaks of food poisoning. These have already been examined in Chapter 2 (Table 2.8.) and compared with the finding of the Port Talbot study in Chapter 3 (Table 3.15). They are now compared with the findings of this study, bearing in mind that these are converse results and should reflect accordingly.

Table 5.5. Comparison with the Roberts Study

Factor	Roberts %	Factor	Port Talbot %
Preparing too far in advance	57	Not identified	
Storage at ambient temp	38	Store correctly	53
Inadequate cooling	30	Cool correctly	12
Inadequate re-heating	26	Discard leftovers	2
Contaminated processed food	17	Buy fresh	52
Undercooking	15	Cook thoroughly	57
Contaminated canned food	7	Buy good quality	5
Inadequate thawing	6	Defrost thoroughly	17
Cross contamination	6	Store raw/cooked separately	50
Raw food consumed	6	Not identified	
Improper warm holding	5	Keep food hot	5
Infected food handlers	4	Personal hygiene	17
Use of leftovers	4	Discard leftovers	2
Extra large quantities prepared	3	Not identified	

The above indicates a lack of knowledge on the part of the residents of Port Talbot in respect of temperature control. This compares with the results of Chapter 3 and identifies an area that should be targeted in health education and future promotional campaigns.

The table below brings together the findings of the knowledge survey with those of this survey and highlights the areas identified as those common to both surveys which would need to be included in a health promotion strategy.

Table 5.6. Comparison of the Results of the Knowledge Survey with those of the Beliefs Survey

Subject Area	Knowledge Survey	Beliefs Survey
Defrost foods thoroughly	47%	14%
Cook food thoroughly	49%	48%
Keep food hot	2%	5%
Operate fridge/freezer at correct temperature	56%	23%

Several previous studies have also identified inadequate cooking to be a possible cause of food poisoning in the home. The table below indicates the results of those studies.

Table 5.7. Previous Studies Identifying Cooking Thoroughly

Study	Percentage response identifying not cooking thoroughly to be a possible cause of food poisoning in the home
FDF 1996	61
Altekruse et al 1995	68
Roberts 1982	15
Bryan 1988	15
Port Talbot	57

It is noted from these studies that the majority of respondents believe that "cooking food properly" will help to prevent food poisoning. Bryan's study of 1988 and Roberts in 1982 reported that undercooking of food was responsible for only 15% or less of food poisoning, other factors being highlighted in their studies which included "inadequate re-heating".

This however was not identified in the present study, although keeping food hot and not using leftovers were.

Good personal hygiene was mentioned by 33% of respondents in the FDF survey of 1996. Whilst the term itself is too broad to have any real meaning some comparisons can be made. Roberts in 1982 identified infected food handlers as contributing to 4% of outbreaks of food poisoning in England and Wales 1970 - 82. In the present study only 16 out of the 108 respondents (14%) included personal hygiene in their list.

In the MAFF study of 1988, other than checking the packaging, checking the best before date was seen as the most important thing to do to keep food safe.

Although only a small number in the FDF survey considered using food after the best before date to be a cause of food poisoning, 64% claimed they always checked it before purchasing food. This may suggest that at the point of sale customers inspect the food but that once purchased they believe it to be safe.

In the present study 49 (45%) respondents included "buy fresh" in their list, 5 (5%) included "buy good quality", 5 (5%) included "check appearance" and 4 (4%) included "not storing too long". All indicators of quality but not of bacteriological safety. None included reference to the "best before" or "use by" dates.

The knowledge study discussed in Chapter 3 included a question regarding use by/best before dates. 85% said they always looked at the use by/best before dates when buying food, 13% looked at them sometimes and 2% never.

If residents in Port Talbot do look at the dates on food as the survey in Chapter 3 would indicate, then it would appear from the present study that they do not regard this of relevance to the safety of the food.

49 (45%) respondents included correct storage of food in their list of what they believed to be the most important things they could so to make food safe, 25 (23%) referred to the correct operating temperatures of fridges and freezers and 11 (10%) referred to the correct cooling of foods.

The results of the FDF report of 1996 suggest that the majority of respondents did not know the correct temperature at which a refrigerator should operate, and even more disturbing was the response given as to why the refrigerator should be run at this temperature was "to stop food going off". This implies that food spoilage is considered to be more important than the growth of pathogenic bacteria.

In the knowledge survey of Chapter 3, 68% of respondents had never measured the temperature of their refrigerator, 37% had never adjusted the temperature of their refrigerator, 42% didn't know at what temperature their refrigerator should be operating and 31% gave the wrong operating temperature.

Whilst the public would therefore appear to appreciate that there is a relationship between storage of food and temperature control they do not understand the implication with respect to bacterial growth. Also they would appear to believe that once stored in the refrigerator there is no need for further checking or control, the suggestion being that refrigerators operate at the correct temperature, thus providing a false sense of security.

Also, if, as the FDF report implies, the majority of people believe refrigeration is important to stop food going off, then it raises the question as to whether people

realise that bacteria are invisible to the naked eye and it is therefore impossible using the senses to determine if that food could cause food poisoning.

A similar study was carried out concurrently in an area of south east Wales. Whereas the Port Talbot study concentrated on adults, the south east Wales study looked at children and young adults.

A total of 438 children participated in the study.

The table below compares the top six results for the south east Wales with the figures obtained for the present study:

Table 5.8. Comparison of South East Wales Study with the Present Study

	South East Wales %	Port Talbot %
Cook properly	69	48
Wash hands	57	74
Best before date	50	45
Keep refrigerated	45	23
Keep covered	38	22
Clean surfaces	28	66

In the Port Talbot survey 48% of respondents identified cooking food properly as something they could do to keep food safe. In the south east Wales survey 69% of respondents identified cooking properly, an increase of 21%.

Similarly with respect to keeping food refrigerated, another aspect of temperature control, 23% identified this in the Port Talbot survey whereas 45% identified it in the south east survey, an increase of 42%.

It would therefore appear that children put more importance on temperature control than do adults.

In respect of personal hygiene however 74% of respondents in the Port Talbot survey identified washing their hands as something they could do to make food safe, whereas only 57% of the south east Wales respondents felt this to be important, a difference of 17%.

Similarities were noted in the responses to observance of the "best before" date on products with 50% of the south east Wales respondents and 45% of the Port Talbot respondents taking heed of this.

However in issues relating to cross contamination 38% of respondents in the south east Wales survey would keep food covered whereas only 22% of Port Talbot respondents thought this to be an important factor in keeping food safe.

Cleaning surfaces before using them to prepare food however was felt to be more important by Port Talbot respondents with 66% identifying this whilst only 28% of south east Wales respondents included it as something they could do to keep food safe.

Whilst there are some similarities between the results it would appear that adults put more of an emphasis on hand washing and keeping surfaces clean than do children in avoiding food poisoning. However, children consider cooking properly and covering food of more importance than adults.

The table below compares the findings of the present study with those of the knowledge study discussed in Chapter 3 relating to the common causes of food poisoning:

Table 5.9. Comparison with the Common Causes of Food Poisoning identified in the Knowledge survey of Chapter 3

Cause	Knowledge Survey %	Beliefs Survey %
Keeping food too long	94	4
Flies	94	Not identified
Inadequate thawing	90	14
Undercooking	89	48
Cross Contamination	88	43
Insects/cockroaches	82	10
Reheating food	81	Not identified
Thawing then refreezing	81	Not identified
Poor handwashing	80	74
Rats or mice	80	Not identified
Leaving food uncovered	75	22
Animals/birds	70	6
Contamination after cooking	69	Not identified
Keeping food at room temperature	69	Not identified

It is interesting to note that whilst 94% in the knowledge survey identified keeping food for too long to be a common cause of food poisoning, only 4% of respondents in the Beliefs survey felt that keeping food for too long was something they had control over in their own home in order to keep food safe. Similarly the responses to inadequate thawing, undercooking, cross contamination, and leaving food uncovered, all areas identified as common causes of food poisoning were not perceived by many as being areas over which they could exercise control.

5.6. Conclusions

Hand washing would appear to be one of the more important beliefs that people have about food safety. The results of the FDF (1993 – 1996) support this statement as do the results of the Mullen study (1998). However as has been noted what people say they do and what they actually do can be significantly different (Worsfold 1994). Significant differences were also noted between what adults and children believe regarding food hygiene as identified above.

The information gained from this study will now be used together with that from the studies carried out in Chapters 3 and 4 to construct an attitude survey which will be targeted in the Port Talbot area to assess the attitudes of the residents there to food safety.

Chapter 6

Consumer Attitudes towards Food Safety Issues in the Port Talbot Area

6. CONSUMER ATTITUDES TOWARDS FOOD SAFETY ISSUES IN THE PORT TALBOT AREA

6.1. Introduction

This chapter assesses the attitude of the public in Port Talbot towards food safety. The results of this study, together with those undertaken and discussed in Chapters 3 – 5 will be discussed in Chapter 7 and used to inform the formulation a health education strategy for the local authority.

6.2. Background

Food safety has been a major issue in the United Kingdom for the past few years (Arkin 1991, Shepherd and Sparks 1992) and will undoubtedly remain of basic importance to consumer confidence in the food industry. Research undertaken in Leicester (Goode and Sherratt 1994) reveals the public lack confidence in the food industry. Results of this research however contrast with the work undertaken in America (Hammonds 1985), which reported no general decline in overall confidence in the food supply. However this could be due to publicity given to food poisoning outbreaks and food safety issues by the media which has been demonstrated in Chapter 4.

Consumers have a part to play in the safety of the food they eat, whilst food safety knowledge and sources of information have been looked at, the provision of knowledge alone is not enough to change habits e.g. anti-smoking campaigns. Changing attitudes may be a significant factor in changing behaviour (Gross 1995, Rennie 1995).

It is acknowledged that domestic food hygiene practices are important (Scott 1983), however attitudes and behaviour will have to alter if we are to see a reduction in

cases of food poisoning (Scott 1983). It is therefore important to consider what attitudes are and how they can be changed (Downie et al 1990).

Attitudes are acquired on the basis of some experience or evidence, either direct or indirect, they are not fixed at birth, but acquired in some way at some stage in life and in this way they are clearly distinct from instincts (Downie et al 1990). Issues to be examined if we are to be clear of consequences expected from health education programmes to effect a change in attitudes.

6.3. Attitudes

6.3.1. What is an Attitude?

A number of definitions of an attitude exist Elms (1976), defined an attitude as "a blend or integration of beliefs and values". Beliefs represent a knowledge or information and values largely comprise our judgments of the world Allport (1935) defined a value as "a belief upon which a man acts by preference".

Therefore, whereas beliefs are neutral and non-evaluative, values by definition involve an evaluation.

It is worth noting that while average people may have many thousands of beliefs, they may have only a few dozen values, which combine to form several hundred attitudes (Rokeach 1968).

It is important to make the point that attitudes, beliefs and values are hypothetical constructs and cannot be directly measured and observed but must be inferred from behaviour. Also they are very closely inter-related and there are no clear differences between these concepts (Gross 1995).

6.3.2. The Three Aspects of Attitude

There are three distinct aspects of attitude:

1. The cognitive component which concerns the individual's belief about the object of attitude. It represents the individual's own direct or indirect intellectual evaluation of the object based on facts collected or acquired.
2. The affective component which is the individual's feelings, likes, dislikes and emotions and
3. The conative component, which is the behavioural component of an attitude: the term behaviour taking in a wide range of phenomena, verbal and non-verbal, including consciously effected actions and even physiological reactions.

There is difficulty therefore in assuming that what a person says or does is an accurate reflection of his or her attitude and this in turn causes difficulties in first identifying and then measuring attitudes (Downie et al 1990, McKie and Wood 1992).

The statements used in this study were designed keeping the above in mind and based equally on the cognitive and conative aspects.

6.3.3. Methods of Identifying Attitudes

Given that the cognitive, affective and conative aspects need not coincide two ways have been identified of assessing the attitudes held by a person:

1. By asking people directly what is their attitude towards the situation of interest.
2. By observation of peoples behaviour - and thereby indirectly identifying their attitude.

Downie et al (1990) have outlined problems with these methods. In the first method the response received may be what people think is the "correct" one or which they think the interviewer "wants to hear".

The second method also has its difficulties since it assumes that behaviour is a true reflection of attitude. Again when people know they are being observed they may do what they think is "correct" or again what they believer the observer wants to see. The observation of people's behaviour in the field of domestic food hygiene also poses problems as it involves gaining access to their homes.

For the purpose of this study it was therefore decided to assess attitude by means of a questionnaire, constructed in accordance with the Likert scale, and targeted at those who prepare food in the home (Downie et al 1990).

6.4. Method

A questionnaire was designed to assess attitude to food hygiene by asking respondents to express their views about a number of statements. Care was taken when drafting the statements to ensure there were an equal number of cognitive and conative questions, that they covered the areas identified in the previous studies, e.g. personal hygiene, temperature control, cross contamination and that the responses would be truly representative of their attitude to food hygiene and not influenced by external factors, e.g.: -

- More general and less thought provoking statements were asked first so the participant would not be discouraged from answering the complete questionnaire.
- The statements were designed so as not to suggest that certain responses were expected or "correct", which would bias the participants response towards particular answers.
- Statements were placed in an order where different responses indicated different attitudes (e.g. on some statements the strongly agree indicated a positive response whereas on others it indicated a negative response). In order to avoid a

"response set" where participants fall into the habit of giving the same response many times in a row response options were contra ordered.

- Care was taken when writing the statements to avoid technical terms and/or jargon which the average person would not be able to understand.
- Statements were written to avoid ambiguity so that people were able to clearly understand the content of the statements.
- No leading questions were included.
- The questionnaire was administered by the author to ensure continuity of the survey.
- Care was taken not to present too many statements so that participants did not become bored and lose concentration.
- Double barrelled statements were not included.

A pilot study was carried out, the questionnaire being administered to 17 participants, and the results of this analyzed. It was found that certain questions were not suitable for inclusion in the final questionnaire as they were not clear and could confuse the respondent; these were removed or modified, and the final form produced (Appendix 7).

In an attempt to ensure consistency with previous surveys discussed in chapters 3 and 5 it was decided to replicate the mode of application of those studies with the whole of Port Talbot being targeted by each twentieth house being visited. The person answering the door was asked if they purchased and prepared the food in their home and provided they purchased and prepared food more than once a week they were asked if they would contribute to the survey. If the respondent indicated they did not purchase or prepare food then the interview was terminated and the author moved on

to the next property. Unfortunately not many were keen to participate and this resulted in a lower response rate with only 64 questionnaires being completed.

No account was taken of the occupation of the respondent when selecting the sample; however the questionnaire asked for the occupation of the primary wage earner in the household. Since this may not be the occupation of the respondent it would not be appropriate to compare differences in attitudes towards food safety held by people in different occupations using the results.

Forty-two questions in total were asked of each participant. After the questionnaire had been completed each question was scored (in accordance with the Likert scale) from 1 to 5 points. One point indicating a very negative attitude, 5 points a very positive attitude, and 3 points (the mid point) being neutral. Thereby the participants' attitude across a broad spectrum of food safety issues was measured according to their total score for the questionnaire.

Four questions, which did not specifically relate to the participants attitude towards food safety but provided useful information for other reasons were not included in the scoring system. For example questions relating to the family and friends of the participants are important in order to determine the role of social influences in shaping attitudes towards food safety but do not directly relate to the participants own attitude.

In order to look at how respondents addressed each issue the maximum and minimum score per question is given below:

Table 6.1. Maximum/Minimum Scores per Question/Respondent

Maximum score per respondent	190
Minimum score per respondent	38
Neutral score per respondent	100 – 130
Maximum score per question	320
Minimum score per question	64

6.5. Results

The full table of the results of the survey is attached in Appendix 8.

37 (58%) respondents were female and the remaining 27 (42%) were male. Only 2 (3%) were aged below 25 (a female and a male). 6 (9%) females were aged over 60; however no males were aged over 60.

Of the 27 males only 3 had a total score of less than 140, these being 137, 135 and 133. However, of the 37 females 13 had a score of less than 140 with 1 having a score of less than 130. This being the lowest score at 126.

The highest score attained was 166: this was by a male aged between 30 - 34, who did prepare food but had received no food hygiene training. Only 10 (16%) respondents had received any formal food hygiene training.

Appendix 9 indicates the overall score of each respondent to all the questions, whilst Appendix 10 gives the overall score per question.

In summary, the results were:

Table 6.2. Results of Attitude Survey

Mean score	145.6
Median score	144.5
Range	40
Interquartile range	12
Standard deviation	9.3

Since the mean is approximately equal to the median it is reasonable to assume the data are not unduly distorted by outliers. The standard deviation is comparatively small, indicating in general the results are grouped closely around the central value.

The responses to each individual question are contained in the full table of results in Appendix 11, but can be broken down into the following categories:

SECTION 1

The Importance of Food Hygiene

52 of the 64 respondents (81%) recognised the importance of food hygiene, responding positively to the statement that they had more important things to think about than food hygiene, with only 4 (6%) feeling that they did have more important things to think about and 8 (12%) not having feelings either way.

When presented with the statement "Good food hygiene will prevent food poisoning" 59 (92%) of the respondents either agreed or strongly agreed, only 2 (3%) disagreed and 2 (3%) neither agreed nor disagreed, again demonstrating a positive attitude (Fig. 6.1. overleaf).

Provision of Information

57 (89%) of respondents found instructions on the label useful in preparing food, 3 (4%) did not and 4 (6%) did not have feelings either way (Fig. 6.2. overleaf).

When presented with the statement "Television chefs could be good role models for food hygiene" 53 (83%) of respondents felt they could. Only 3 (4%) respondents did not agree with this (Fig. 6.3. overleaf).

Fig. 6.1. Responses of Participants to the statement "Good Food Hygiene will Prevent Food Poisoning"

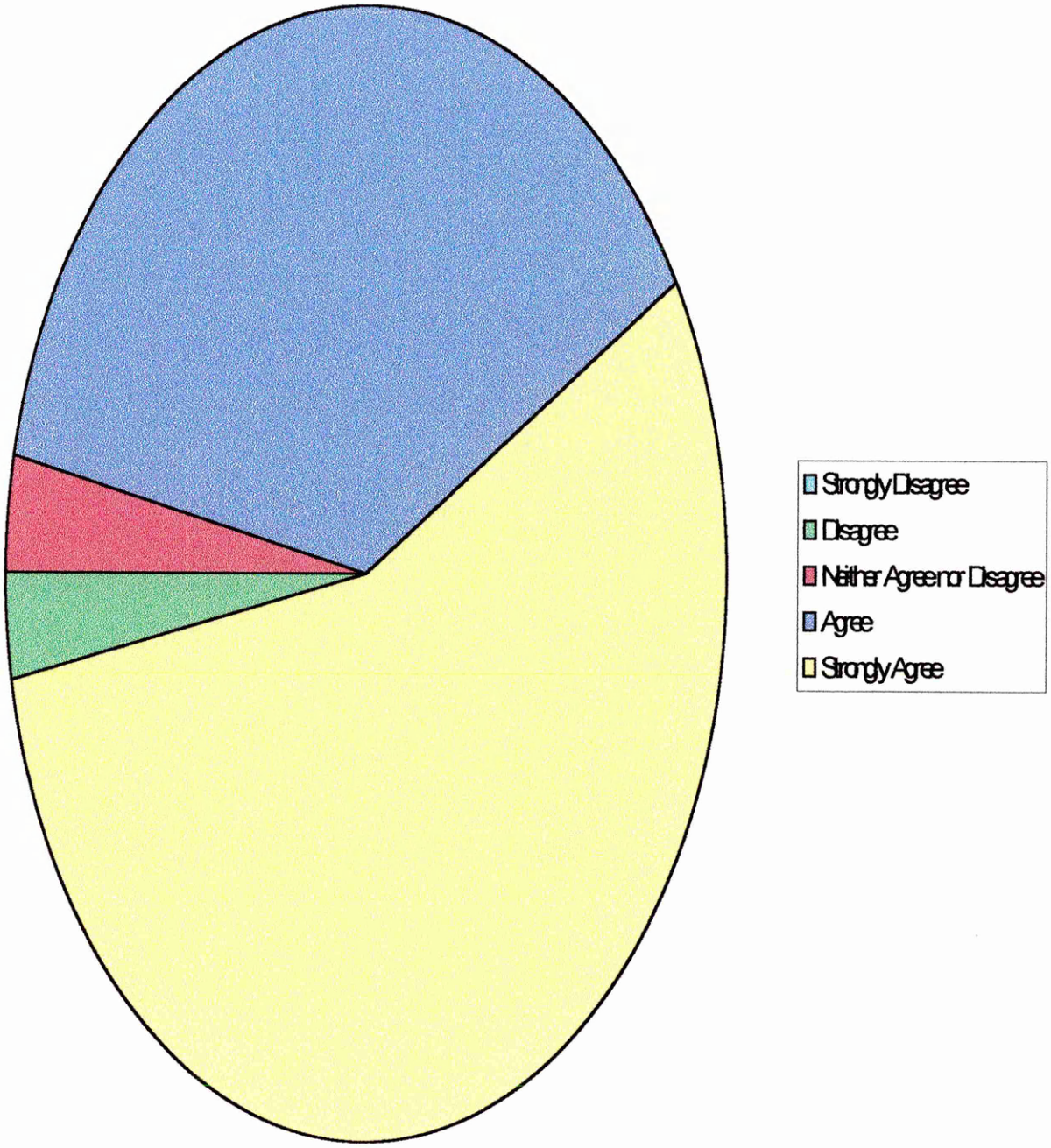


Fig. 6.2. Responses of Participants to the Statement "I Find Instructions on the Label Useful in Preparing Food"

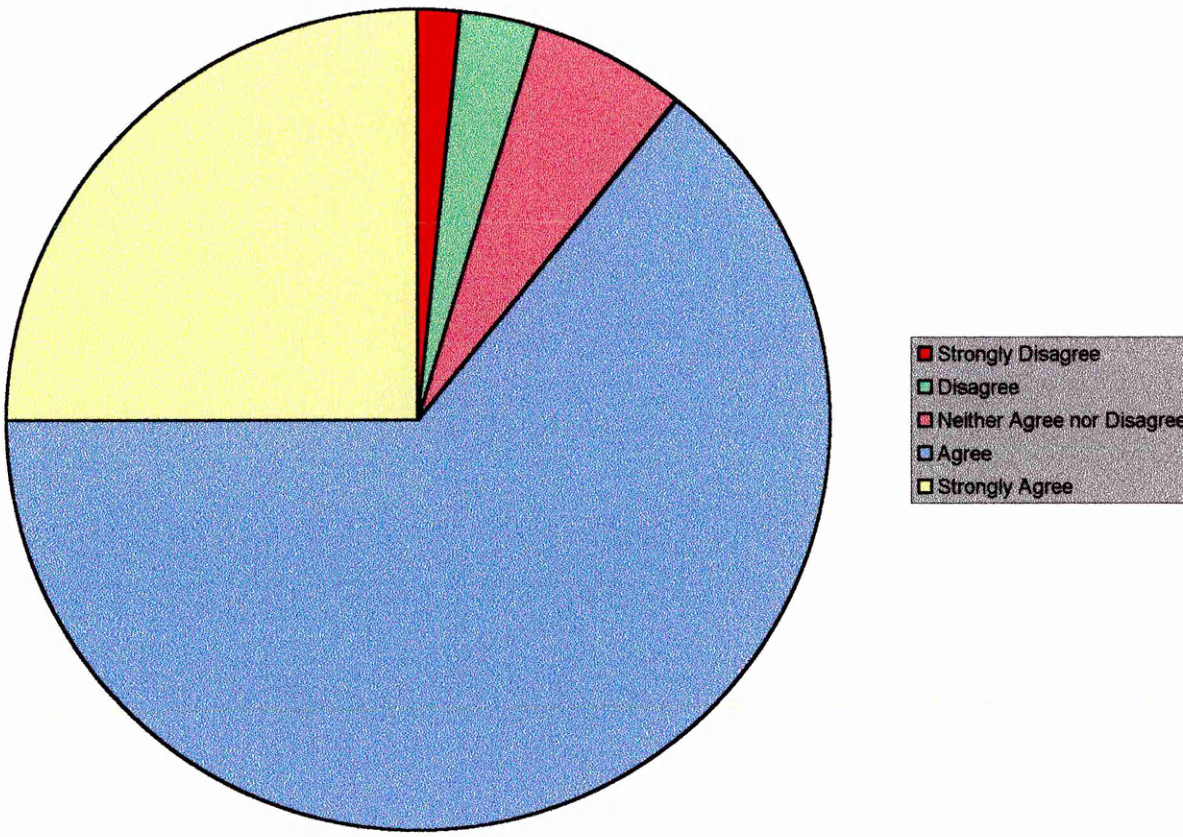
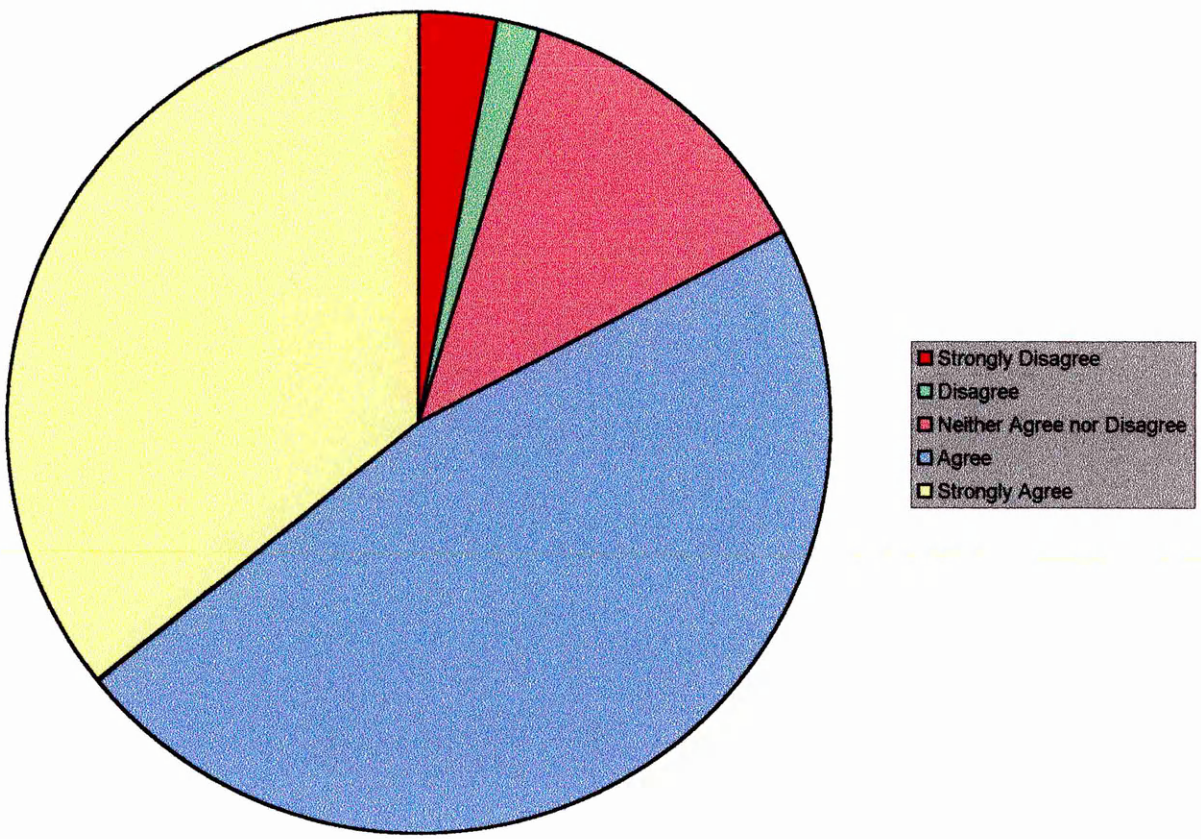


Fig. 6.3. Responses of Participants to the Statement "Television Chefs Could be Good Role Models for Food Hygiene"



With regard to cookbooks, 51 (80%) participants felt that cookbooks/recipes were a potentially useful source of food safety information (Fig. 6.4. overleaf).

These figures are demonstrated in the table below:

Table 6.3. Provision of information

	Strongly Agreed/ Agreed	Strongly Disagreed/ Disagreed	Neutral
Instructions on labels	57 (89%)	3 (4%)	4 (6%)
Television Chefs	53 (83%)	3 (4%)	8 (12%)
Cookbooks	51 (80%)	4 (6%)	9 (14%)

Recognition of their own role

39 (61%) respondents did see the home environment as having the potential to cause food poisoning with only 13 (20%) agreeing that food poisoning rarely if ever occurred in the home (Fig. 6.5. overleaf).

Whilst respondents did not appear to recognize their role in preventing food poisoning, 55 (86%) expressed satisfaction at being able to prepare food hygienically indicating a very positive attitude. Only 1 (1%) disagreed. However 8 (13%) respondents had no feelings either way (Fig. 6.6. overleaf). However 56 (88%) respondents felt that they did have control over hygiene when preparing food in their homes, whilst 5 (8%) did not (Fig. 6.7. overleaf).

To the statement "Consumers generally do not have the facilities for good hygiene" 2 (3%) participants strongly agreed with the statement, 6 (9%) agreed and 12 (19%) neither agreed nor disagreed. However 44 (69%) respondents felt that consumers did have the facilities to practice good hygiene at home.

Fig. 6.4. Responses of Participants to the Statement"Cookbooks/Recipes Are Potentially Useful sources for Food Safety Information"

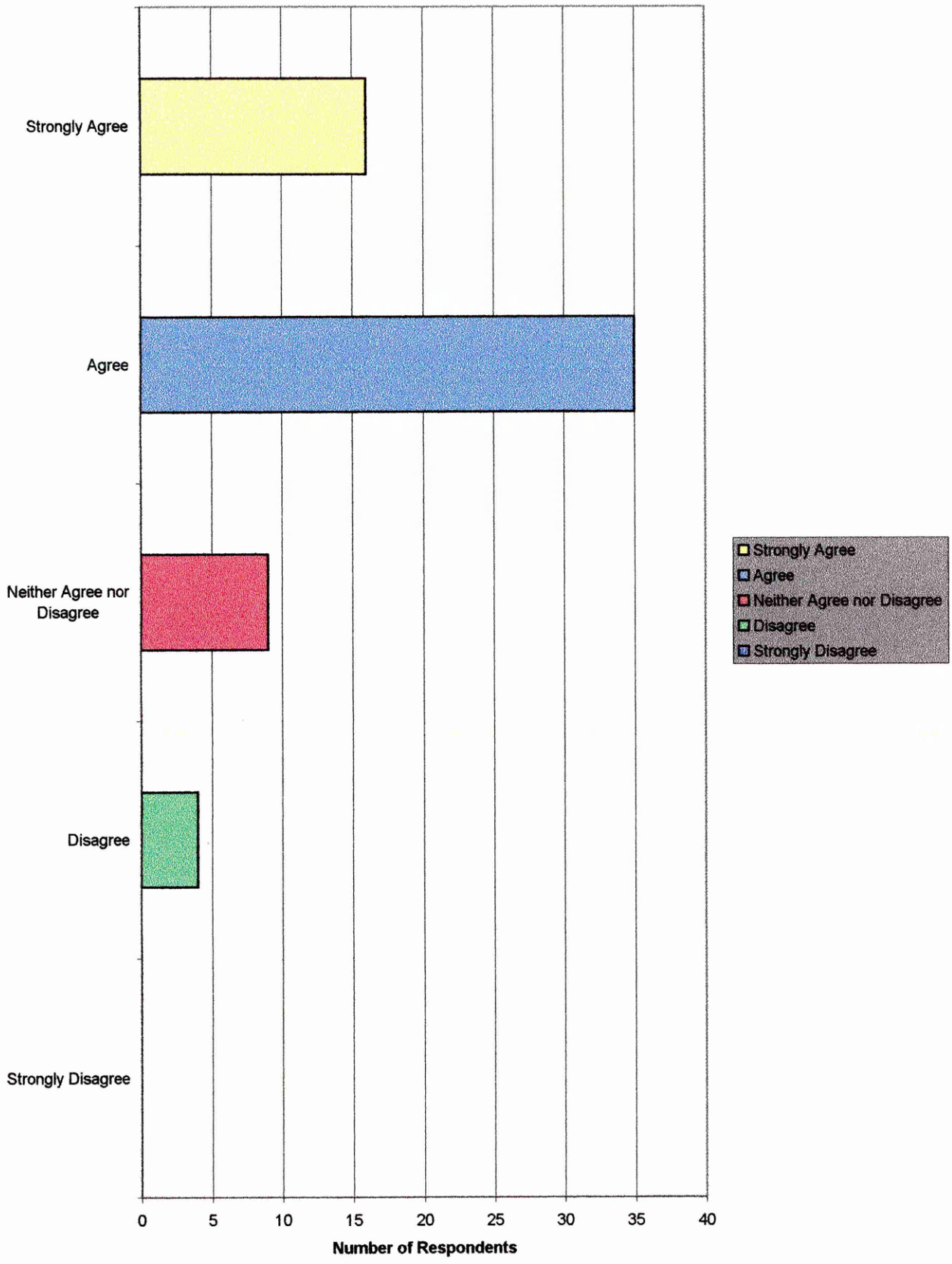


Fig. 6.5. Responses of Participants to the Statement "Food Poisoning rarely if ever Occurs in the Home"

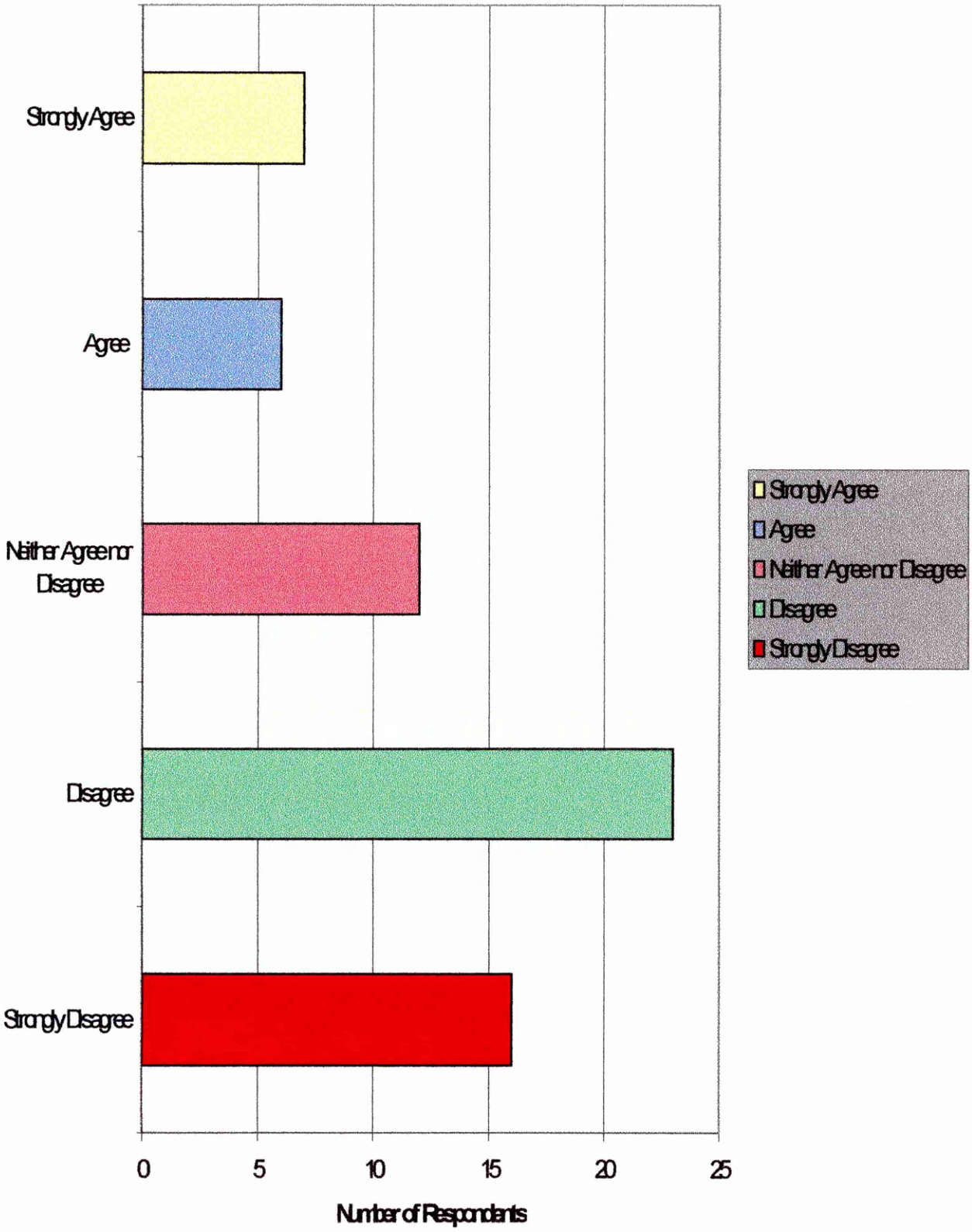


Fig. 6.6. Responses of Participants to the Statement "Preparing Food Hygienically Gives Me Satisfaction"

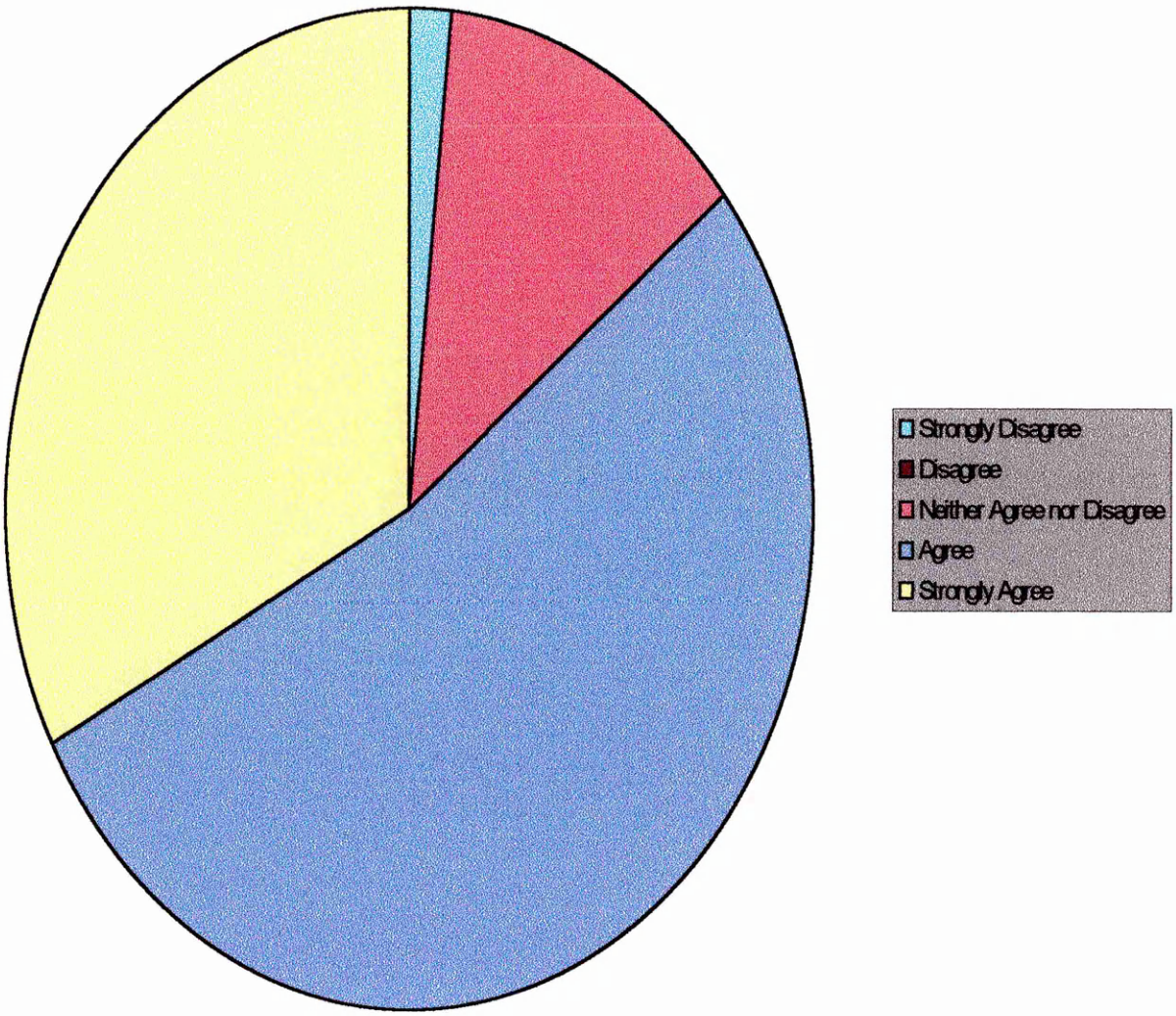
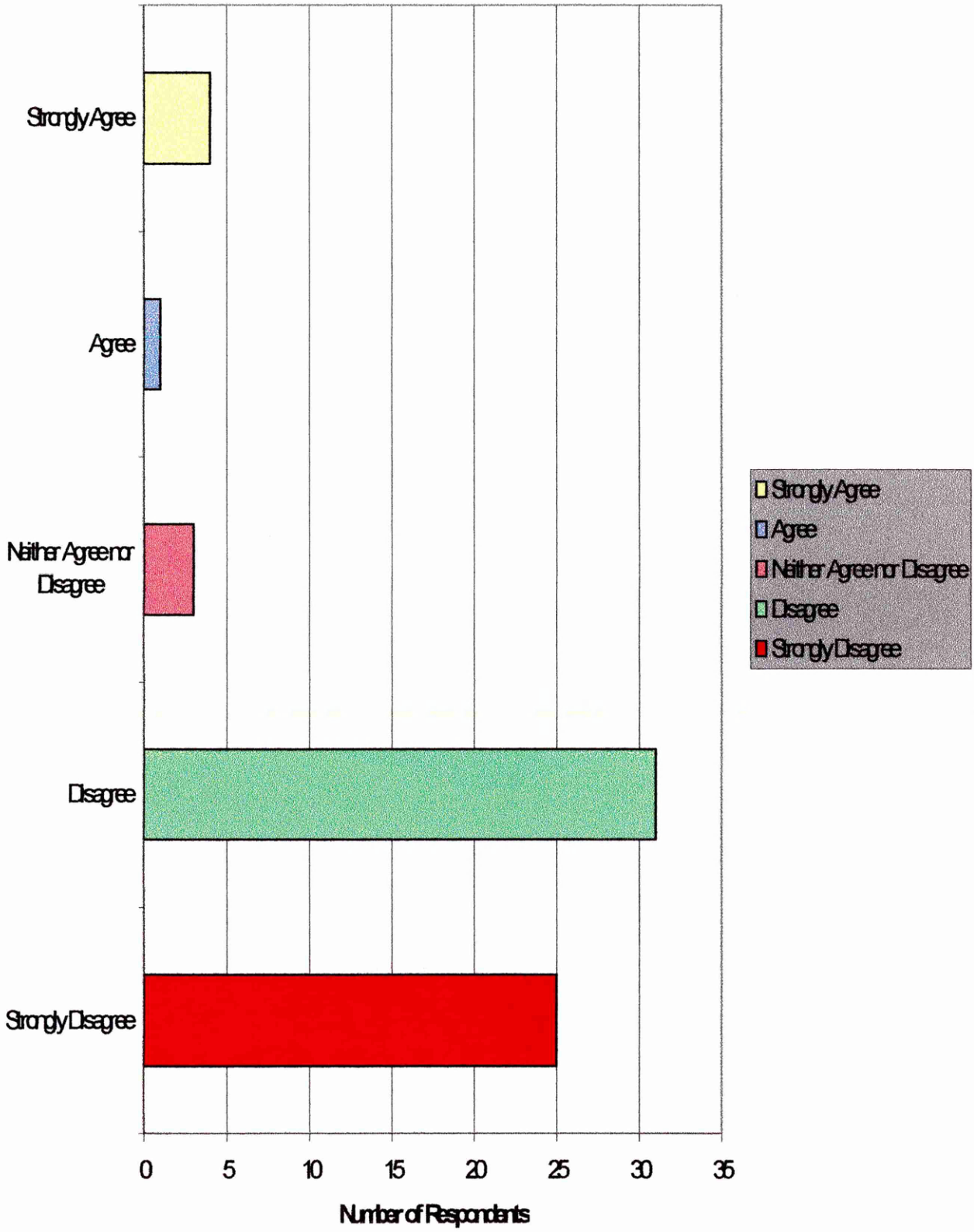


Fig. 6.7. Responses of Participants to the Statement "I have very little control over Hygiene in Food Preparation in my Home"



In respect of the statement "The responsibility for food hygiene lies with the person who sells the food" 11 (17%) respondents strongly disagreed, 18 (28%) disagreed, 14 (22%) agreed, 11 (17%) strongly agreed and 10 (16%) were neutral (Fig. 6.8. overleaf). 3 (4%) of respondents strongly disagreed that the responsibility for food hygiene information should lie with the local authority 21 (33%) disagreed, 9 (14%) strongly agreed, 11 (17%) agreed and 20 (31%) neither agreed nor disagreed (Fig. 6.9. overleaf).

46 (72%) respondents did not agree storing cooked food at room temperature in the kitchen was difficult to avoid. 10 (16%) were neutral and 8 (13%) agreed it was. The statement "Preventing contamination of foods in the kitchen requires care" elicited a very positive response with 62 (97%) of the 64 respondents appreciating that care is needed in the kitchen if food poisoning is to be prevented. Only 1 (1%) person neither agreed nor disagreed, and 1 (1%) did not feel that care was needed.

Practices

Several questions related to practices. These have been grouped in the areas below:

a) Personal Hygiene/Handwashing

In respect of handwashing 61 (95%) respondents acknowledged the importance of hot soapy water for this task. Only 2 (3%) did not agree and 1 (2%) neither agreed nor disagreed. 54 (84%) respondents demonstrated a positive attitude to the need for handwashing before handling cooked food, however 7 (11%) did not agree nor disagree with the statement (possibly a lack of knowledge), and 2 (3%) strongly disagreed.

To the statement "Hands may contaminate food during its preparation" 61 (95%) of respondents acknowledged that food can be contaminated by the handler during preparation.

Fig. 6.8 Responses of Participants to the Statement "The Responsibility for Food Hygiene Lies with the Person who Sells the Food"

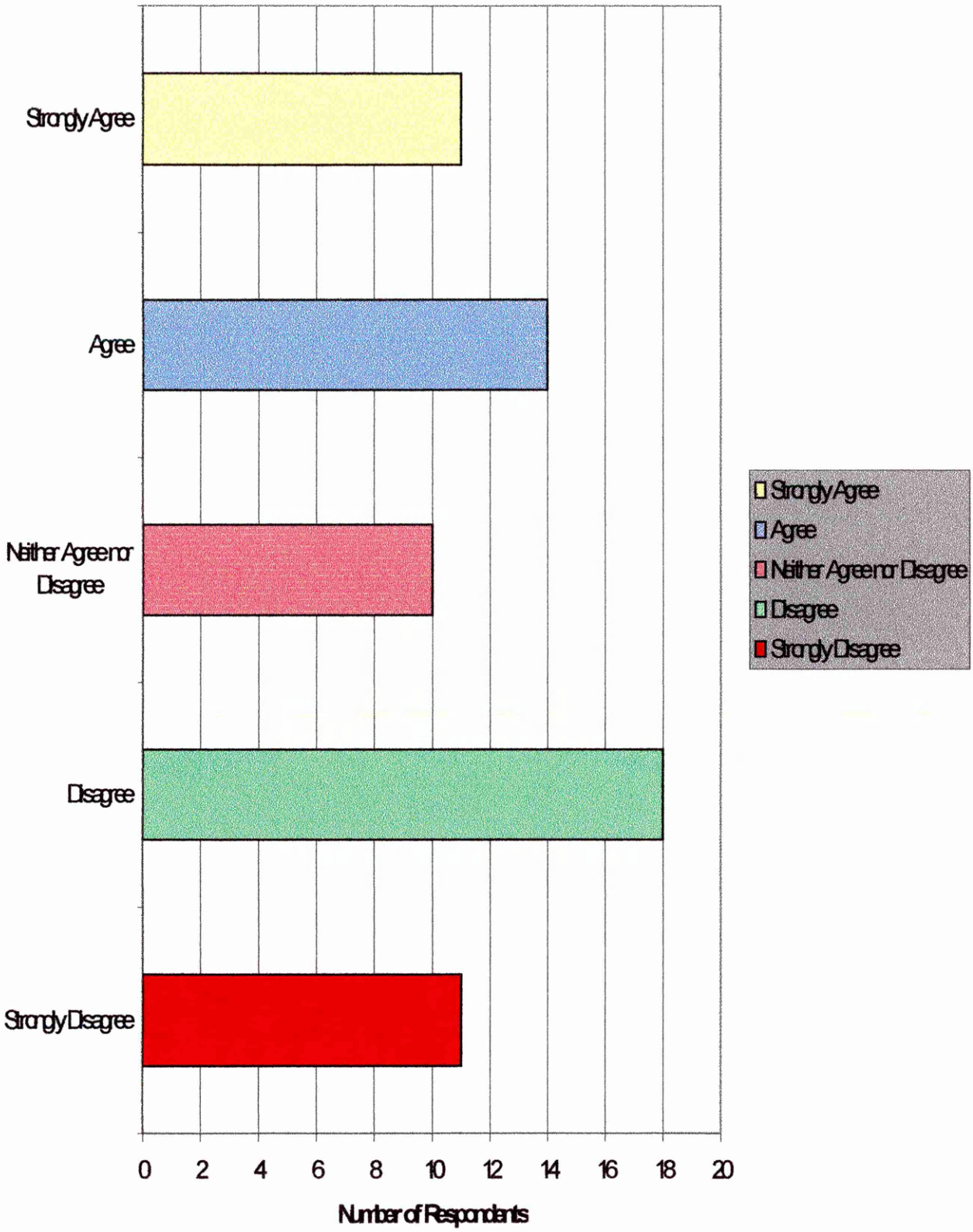
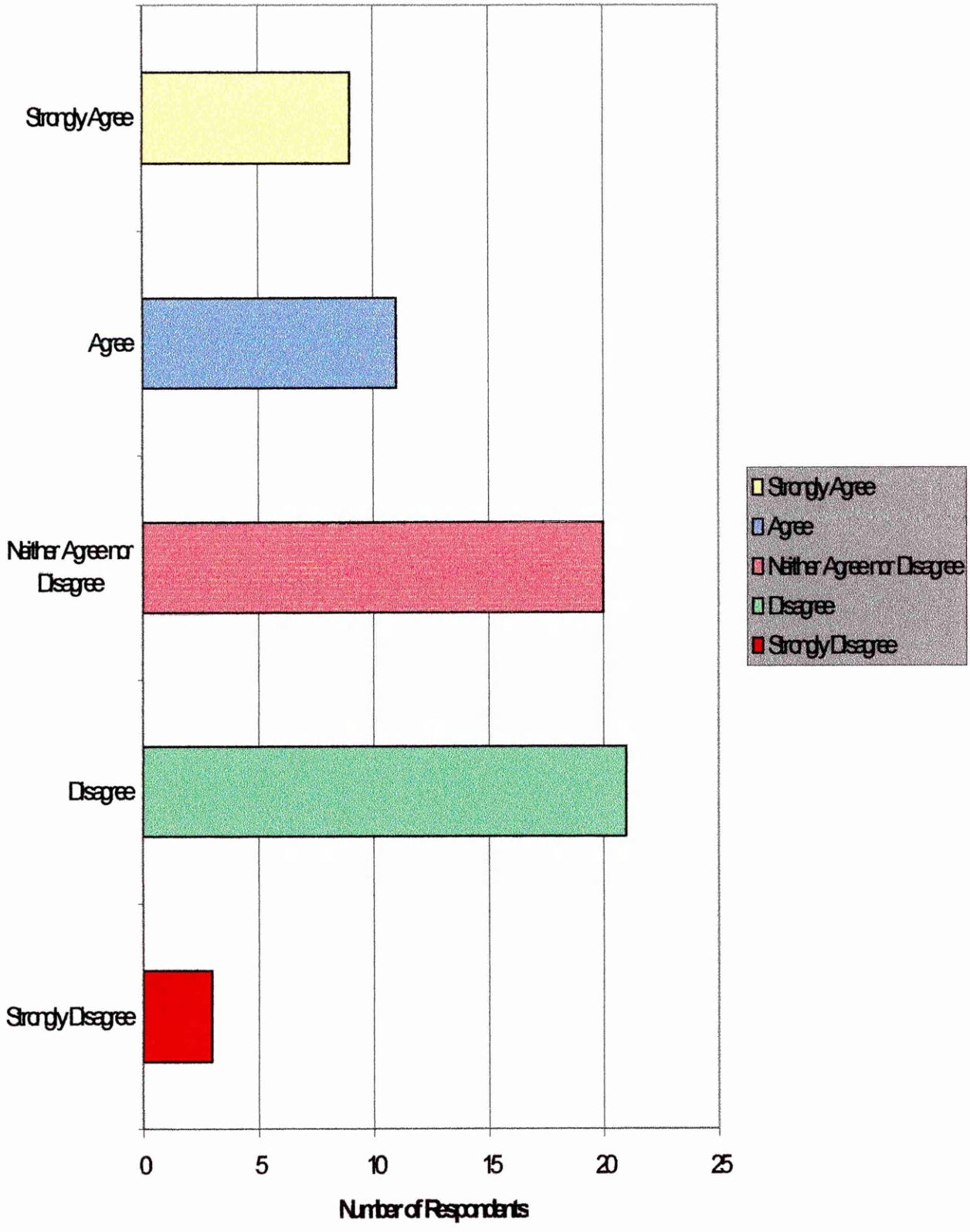


Fig. 6.9. Responses of Participants to the Statement "The Responsibility for Food Hygiene Information should Lie with the Local Council"



The responses to the statements regarding the importance of clean hands in preparing food are summarized in the following table:

Table 6.4. Importance of clean hands in preparing food

	Strongly Agreed/ Agreed	Strongly Disagreed/ Disagreed	Neutral
Use of hot soapy water	61 (95%)	2 (3%)	1 (2%)
Handwashing	54 (84%)	2 (3%)	7 (11%)
Hands may contaminate food	61 (95%)	1 (1%)	1 (1%)

In respect of the statement "Personal hygiene is more critical in handling cooked than raw foods" only 16 (25%) of the 64 participants acknowledging the need for good personal hygiene in handling cooked food as being more critical than in handling raw foods. 27 (42%) disagreed with the statement, 7 (11%) strongly disagreed and 14 (22%) neither agreed nor disagreed.

b) Cross contamination

The results in respect of cross contamination can be tabulated as follows:

Table 6.5. Importance of Cross Contamination

	Strongly Agreed/ Agreed	Strongly Disagreed/ Disagreed	Neutral
Separate worksurfaces needed for raw and cooked food	52 (81%)	6 (9%)	6 (9%)
Disposable paper towels are more hygienic than dishcloths	57 (89%)	2 (3%)	5 (8%)
Use different utensils for raw and cooked food	52 (81%)	8 (12%)	4 (6%)
Clean worksurfaces before use	46 (72%)	7 (11%)	11 (17%)
Contact between raw and cooked food can cause food poisoning	58 (91%)	5 (8%)	3 (5%)

With regard to the statement "After using eggs I will not clean the work areas with a germicide" 11 (17%) respondents agreed with this whilst 28 (44%) did not, 23 (36%) respondents neither agreed nor disagreed.

The statement "Handling poultry with care is important" elicited a positive response with 29 (45%) respondents agreeing and 35 (55%) strongly agreeing.

c) Cooking

The responses to statements regarding the importance of cooking food properly in the prevention of food poisoning are as follows:

Table 6.6. Cooking food properly prevents food poisoning

	Strongly Agreed/ Agreed	Strongly Disagreed/ Disagreed	Neutral
Cooking food properly prevents food poisoning	55 (86%)	4 (6%)	5 (8%)
No reservations about serving lightly cooked eggs	35 (55%)	7 (11%)	20 (31%)
Special care needed in cooking food at barbecues	58 (91%)	2 (3%)	4 (6%)

d) Temperature Control

The responses to the statements relating to temperature control can be summarized as follows:

Table 6.7. Need for Temperature Control

	Strongly Agreed/ Agreed	Strongly Disagreed/ Disagreed	Neutral
Keep leftovers on kitchen worksurface at room temp.	1 (1%)	59 (92%)	4 (6%)
Need for thorough defrosting of large items of food	62 (97%)	0	1 (1%)
Need to cool food quickly after cooking	19 (30%)	33 (52%)	12 (19%)
Need to reheat food properly	56 (88%)	6 (9%)	2 (3%)
Care needed in storing rice after cooking	38 (59%)	21 (33%)	3 (5%)

When presented with the statement "after preparing sandwiches I will probably keep them in an ordinary lunchbox" 34 (53%) respondents disagreed with this whilst 22 (34%) agreed. 7 (11%) respondents neither agreed nor disagreed.

Training

54 (84%) respondents felt that in order to ensure food is safe to eat they needed hygiene education. Only 2 (3%) disagreed with this, however 6 (9%) did not having feelings either way.

Knowledge

Seven of the statements were knowledge based and the responses revealed a lack of knowledge on the part of the respondents in respect of food safety.

These can be summarized in the following table:

Table 6.8. Knowledge of Food Safety

	Strongly Agreed/ Agreed	Strongly Disagreed/ Disagreed	Neutral
Impossible to get food poisoning from sweets and puddings	7 (11%)	45 (70%)	12 (19%)
Safety of food can be judged by its smell	28 (44%)	7 (11%)	29 (45%)
Would not prepare food after a stomach upset	40 (63%)	10 (16%)	13 (20%)
Preparing food in advance contributes to food poisoning	25 (39%)	17 (27%)	22 (34%)
Serving food rare or undercooked is undesirable	51 (80%)	2 (3%)	11 (17%)

Whilst 45 (70%) respondents acknowledged that sweets and puddings can cause food poisoning, 19 (30%) did not and may not be taking the care necessary when handling these foods. 28 (44%) respondents believed that the safety of food could be judged by its smell whilst only 7 (11%) disagreed with this statement, 29 (45%) were neutral. Only 40 (63%) would not prepare food after a stomach upset, and only 25

(39%) acknowledged that preparing food in advance can contribute to food poisoning, 17 (27%) disagreed with this and 22 (34%) were neutral. However, 51 (80%) respondents agreed that serving food rare or undercooked is undesirable; only 2 (3%) disagreed with this, 11 (17%) were neutral.

SECTION 2

Section 2 asked respondents to tick on the following list sources they would use as providers of food hygiene information. The total ticking each category is indicated.

Table 6.9. Providers of Food Hygiene Information

	Total
Cookery books	58 (91%)
Talks by environmental health officer	58 (91%)
Food manufacturers	58 (91%)
Packaging	57 (89%)
Government	56 (88%)
Food retailers	53 (83%)
Local council	53 (83%)
Television	52 (81%)
Recipes	52 (81%)
Magazines	51 (80%)
Leaflets	51 (80%)
Parents	48 (75%)
Newspapers	48 (75%)
Home	47 (73%)
School	44 (69%)
Displays	41 (64%)
Videos	39 (61%)

6.6. Statistical Analysis

6.6.1. Test to determine if there is a significant difference in attitude towards food safety between male and female respondents

Introduction

The culture from which the respondents were selected traditionally has strongly defined social roles for both men and women in relation to the preparation of food. Traditionally, women have been held responsible for the purchase, preparation and serving of food, which encompass most of the activities that have a bearing on food safety.

Education also complied with these social roles, the teaching of cooking in schools being more prevalent among female students than males. Over the years this stereotype has largely broken down, with many more men now taking an active part in the preparation of food, both commercially and in the home.

A great deal of the information aimed at the safe preparation of food is targeted at the purchaser/preparer, via such media as preparation instructions and leaflets distributed in supermarkets. Therefore, it is reasonable to assume that if women are (on the whole) more likely to purchase and prepare food then, (if the food safety information is being successfully conveyed) they should generally have a more positive attitude towards food safety than men.

However, with the changes in social attitudes, it can no longer be assumed food preparation is the sole responsibility of women, and it needs to be determined whether it is necessary to target men and/or women when seeking to promote food hygiene.

It was therefore decided to carry out a statistical test on the data obtained to determine whether men or women hold a more positive attitude towards food safety.

Test Design

The data collected were of ordinal level and the test required was one of differences involving two variables; therefore the test chosen was the Mann-Whitney test. It was decided to adopt a significance level of 5% for the test, for a 2-tailed hypothesis

Experimental Hypothesis

There will be a significant difference between the attitudes of the male and female respondents

Preliminary Findings

Before carrying out the statistical test, the following results were obtained:

Table 6.10. Comparison of Male and Female Respondents

	Male Respondents	Female Respondents
Mean Score	147.4	144.2
Median Score	147	144
Range	33	39
Interquartile Range	9	13
Standard Deviation	8.6	9.6

This shows the average score for the male respondents was slightly higher than that of the female respondents, and the spread of values for the female respondents was slightly larger than the spread of values of the male respondents. However, these do not necessarily indicate a significant difference between the two groups; thus a statistical test is required. In both groups the mean score was approximately equal to the median score; therefore it can be assumed that the results are not being distorted by the presence of outliers in the data. A Mann-Whitney test was carried out on this data, and at $p=0.05$ it was found that there was no significant difference between the attitudes of male and female respondents towards food safety issues.

Discussion

Social roles may now have changed from the traditional model such that men and women are now equally likely to purchase/prepare food; therefore the underlying assumption that women are more likely to be exposed to information regarding food safety is false.

It is also possible that the traditional model never existed as previously described and men and women have always been equally likely to prepare food.

Another possibility is that the amount of food prepared by a person has no bearing on their attitude towards food safety (suggesting food safety information targeted at those who purchase/prepare food may not be effective), or that the factors affecting the respondent's attitude towards food safety are not information such as preparation instructions or leaflets, but other influences (e.g. television, radio, social influences) to which men and women receive equal exposure. It is also possible attitudes towards food safety are random, and not influenced by any of the factors described above.

6.6.2. Test to determine whether there is a significant difference in the attitudes towards food safety between respondents with and without food hygiene training

Introduction

It is reasonable to suppose that when people receive food hygiene training their knowledge of food safety will increase. However, research has shown that while knowledge and attitudes are linked, they do not always correspond (Gross 1995).

It may therefore be useful to use the results of this study to determine whether those who have received training in food hygiene also have a more positive attitude towards food safety.

Test Design

The data collected were of ordinal level and the test required was a test of differences involving two variables, therefore the test chosen was the Mann-Whitney test. It was decided to adopt a significance level of 5% for the test, for a 2-tailed hypothesis

Experimental Hypothesis

There will be a significant difference between the attitudes of those respondents who have received food hygiene training and those who have not.

Preliminary Findings

Before carrying out the statistical test, the following results were obtained:

Table 6.11. Comparison of Respondents with and without Training

	With Training	Without Training
Mean score	145.2	146.3
Median score	142	146
Range	34	41
Interquartile range	10	10
Standard deviation	10.3	9.4

These results appear to suggest there is no apparent difference between the two groups, with those with food hygiene training apparently having lower mean and median scores than those without training.

The standard deviations show that there is a slightly larger spread in the group that had received training. A Mann-Whitney test was carried out on the data, and at $p=0.05$ it was found that there was no significant difference between the respondents who had received food hygiene training and those who had not.

Discussion

These results could be explained in several ways.

It is possible that food hygiene training is effective at raising only the knowledge of those who partake, and that attitudes need to be changed (or prevented from forming) by other means. Another explanation is that the knowledge gained from the training is not carried through to everyday practices, i.e. the knowledge gained is not put into practice. Further work needs to be undertaken in this area to determine if this is the case.

6.6.3. Test to determine whether there is a significant difference in the attitudes towards food safety between younger and older respondents.

Introduction

The introduction of campaigns to change the public's attitude towards food safety issues is comparatively recent, being largely introduced in response to the increase in the number of reported cases of food poisoning in recent years. If campaigns involving education about food hygiene are successful, they must change the attitude of those targeted by the campaign.

Many attitudes towards issues such as food hygiene are formed during childhood, and are formed partially from experience of the world around. Therefore, it may be reasonable to assume that those who have been exposed to food safety campaigns at a younger age will have been affected more by the campaign, and will therefore have a more positive attitude to food hygiene. Based on this assumption, the purpose of this test is to ascertain whether there is a significant difference between younger and older respondents to the questionnaire regarding their attitude towards food safety. It was decided to first find the approximate mean age, then to consider all those respondents above the median age to be "older", and all those below the median age

to be "younger". (It was not possible to find the exact median age of the participants as the data was grouped).

Test Design

The data collected were of ordinal level and the test required was a test of differences involving two variables, therefore the test chosen was the Mann-Whitney test. It was decided to adopt a significance level of 5% for the test, for a 2-tailed hypothesis

Experimental Hypothesis

There will be a significant difference between the attitudes of younger and older respondents.

Preliminary Findings

Before carrying out the statistical test, the following results were obtained:

Table 6.12. Comparison of Younger and Older Respondents

	Younger Respondents (age < median)	**Older Respondents (age > median)**
Mean score	145.1	146.8
Median score	143	146.5
Range	41	35
Interquartile range	17	8
Standard deviation	10.7	8.5

These results illustrate that both the mean and median of the older age group were higher than those of the younger age group, indicating a slightly more positive attitude. The measures of spread show that there was a significantly lower range of scores from older respondents than younger respondents. A Mann-Whitney test was carried out on the results, and it was found that at p=0.05 there was no significant difference in attitudes towards food safety between the younger and older respondents.

Discussion

It is possible that attitudes towards food safety are learned from sources other than those targeted by the health promotion campaigns, such as parents or peers. Therefore, unless a campaign targets the sources of our attitudes towards food safety, or changes society such that our attitudes are acquired from different sources, it cannot be effective in changing these attitudes.

Another possibility is that the campaigns are targeting the correct areas, but in the wrong manner, and the method of conveying information is unsuitable for the intended audience, necessitating a change in style when delivering messages about food safety.

Although the older respondents may have been influenced by the campaigns to a lesser extent than the younger respondents, they may have acquired similar knowledge from an alternative source, or they may have gained the knowledge through additional experience of handling and preparing food safely. This is especially true considering many members of the younger generations today rely to a much greater extent on eating out and convenience foods than did previous generations.

6.6.4. Possible Reasons for Incorrect Conclusions being drawn

Experimental Design

It is possible that there is a significant difference between the attitude of male and female respondents and that this has not been detected. There are several possible reasons for this.

One that the sample is not representative of the population from which it was drawn, and thus any conclusions drawn cannot be generalized to the population as a whole. This is unlikely, as attempts were made to draw a balanced sample from across a

range of social backgrounds, geographical areas and other relevant factors, which may affect a respondent's attitude towards food safety. However, it is possible that the sample is not fully representative of all factions of the population, since this could require a much larger sample than was feasible to study.

Another possible explanation is that response bias has occurred, in that respondents have replied inaccurately due to a desire to "please" the interviewer. There is evidence in cases such as this that what people say and what they do are not necessarily the same (Defleur and Westie 1958). To counteract this, future studies could rely more on observing participants rather than using questionnaires.

Unsuitable hypotheses being tested

The questionnaire was not efficient at extracting the relevant information.

These assume the conclusion is not valid, and the experimental hypothesis may have been incorrectly disproved due to poor experimental design.

6.7. Discussion

Generally speaking the respondents all showed a positive attitude towards food safety, as noted in Table 6.2. above and therefore a willingness to learn and improve on their skills. This however may be a case of "optimistic bias" (Weinstein 1980, Weinstein and Klein 1996) or an 'illusion of control' (Frewer et al 1993).

81% of respondents felt that food hygiene was important, with 92% acknowledging that good food hygiene practices would prevent food poisoning – a positive attitude and a pleasing response.

With regard to the provision of information, 89% found instruction on the label useful in preparing food, 83% felt television chefs to be a good role model and 80% felt that cookery books were a useful source of food safety information. These high

response rates indicate that these areas could be a valuable way of getting information to the consumer and needs to be explored further.

As EHOs work closely with food manufacturers on the "home authority principle", the increased use of the provision of information on labels and packaging could therefore be easily implemented and could prove a cost effective way of getting information to the consumer.

In respect of the role of television chefs, whilst 83% of respondents felt they could be good role models, the survey carried out in chapter 4 indicates they are not fulfilling this role. This needs to be explored further, with possible approaches being made to television companies. Similarly with regard to cookery books, whilst 80% of respondents felt they were a useful source of food safety information, the survey carried out and discussed in chapter 4 identified this as an under utilized area, which should be developed further.

As can be noted a fairly high percentage of respondents felt that information on food safety should be provided by:

1. manufacturers - on the product label etc.
2. cookery books - which contain the recipe and
3. television chefs - who demonstrate the recipe

All of these have been identified as underutilized areas for food hygiene education.

In recognizing their own role, 61% did not see the home environment as having the potential to cause food poisoning. This mirrored the results of the Port Talbot survey, is contrary to acknowledged facts and is an area that must be concentrated on in future campaigns to ensure the public understands their role in ensuring the safety of the food they consume.

It is interesting to note that whilst respondents did not appear to recognize their role in preventing food poisoning, 69% felt that they had the facilities to practice good hygiene at home – recognition of their role and an acknowledgement that one does not have to have best facilities to produce safe food. This again is an area that should be looked at in future campaigns, consumers needing to be aware of what they need in the home to practice good hygiene and how they can adapt their home situations accordingly.

With regard to whom respondents felt was responsible for food hygiene, when presented with the statement "the responsibility for food hygiene lies with the person who sells the food", respondents were equally distributed with regard to their feelings relating to the retailers responsibility for food hygiene. As noted in previous chapters all persons involved in the food chain have a responsibility. The answers to this question therefore indicate a division in people's agreement as to the responsibility of the retailer; this however does not detract from nor indicate their acceptance of their own personal responsibility.

When questioned about the storage of food at room temperature, 12% felt that this was difficult to avoid, 16% didn't have any feeling either way and 72% did not agree. This may in some way relate to particular problems in their own kitchens, but also demonstrated a lack of knowledge of the need for temperature control.

From the responses to the statements relating to the recognition of their own role in preventing food poisoning it is noted that whilst respondents generally felt that preventing food poisoning required care, they did not all feel able to provide that care, nor did they all acknowledge that they had the facilities and ability in their own home to provide that care, a lack of any ownership or self confidence in themselves?

Whilst respondents demonstrated a lack of confidence in their ability to control food poisoning in their own home, they do have a positive attitude to food hygiene and are employing the correct practices.

Handwashing, an area targeted nationally by Foodlink in their Food Safety Week, to encourage children into "good habits", was acknowledged as important by 100% of respondents.

A very positive attitude was perceived on the part of respondents to the statement "Hands may contaminate food during its preparation" with 95% of respondents acknowledging that food can be contaminated by the handler during preparation. The response to this statement equates to that of Q.4, which addressed handwashing. Considering both questions it would appear respondents have a very positive attitude to the need to prepare food with clean hands.

A disappointing response was received to the statement "Personal hygiene is more critical in handling cooked than raw foods" with only 25% of the 64 participants acknowledging the need for good personal hygiene in handling cooked food as being more critical than in handling raw foods. This may reflect on their interpretation of raw food however and not solely on their knowledge of contamination. As has been noted, similar questions relating to personal hygiene included in the survey had very positive responses; this question should therefore not be taken in isolation. Contamination, however is an area that has been identified as causing some concern and the need for good personal hygiene could be included in future campaigns.

Whilst respondents did not demonstrate a positive attitude towards contamination they did towards the handling of poultry, indicating the publicity given to salmonella and poultry has reached its intended audience. With a similar emphasis being placed on other areas of food safety perhaps a comparable result could be attained.

In respect of cross contamination and the use of different utensils for raw and cooked foods only 12% did not use different utensils, indicating a possible lack of knowledge of cross contamination. 6% were neutral indicating they either did not understand the question or perhaps it would be dependent on the food involved as to what utensils they used.

The balance of responses to the statement "After using eggs I will not clean the work areas with a germicide" lay equally between agreement and disagreement with only 11% of respondents strongly disagreeing and thereby acknowledging bacterial contamination is carried on the shell of an egg. A plethora of information has been made available on eggs and salmonella; it would therefore appear that this has not been completely understood by the public indicating the need to endorse the connection between eggs and salmonella at future campaigns.

Whilst the above results generally indicate a knowledge of cross contamination, some respondents did not appear to appreciate the need to keep raw and cooked food apart at all times. Cross contamination should therefore be included in future campaigns.

Respondents generally demonstrated a positive attitude to the dangers of serving lightly cooked eggs, possibly due to the immense publicity given to this area. However 11% of respondents had no qualms about serving lightly cooked eggs. However it would appear that there is a need to re-emphasize the need for thorough cooking of eggs to avoid food poisoning. 91% of respondents acknowledged that special care is required in cooking food at barbecues. Barbecues have been identified as an area of concern and are normally targeted by the local authority during food safety summer campaigns.

Whilst the above results generally indicate a positive attitude, there is still a need to emphasize the importance of thorough cooking.

There appeared to be some confusion on the part of the respondents to the statement "After preparing sandwiches I will probably keep them in an ordinary lunchbox", with a fairly even display of answers. This could be a misunderstanding of the question and not relating it to the need to keep prepared lunchboxes chilled, or it could be a lack of knowledge on temperature control. Again with respect to the statement "I tend to keep leftovers covered and on a kitchen worksurface until needed" 92% of respondents disagreed which could indicate an understanding of the need for temperature control or may relate to personal practices.

A very positive attitude was demonstrated in the responses to the statement "Large items of food need to be defrosted properly before cooking", with 97% of respondents agreeing. Only 1% neither agreed nor disagreed.

An equal distribution of responses was noted to the statement "Next time I cool food after cooking I will probably do it quickly" indicating a lack of knowledge of temperature control in respect of the growth of bacteria. However, 88% of respondents demonstrated a positive attitude to the importance of reheating food properly in respect of food safety. Only 12% respondents had a negative attitude.

When questioned about the care needed in storing rice post cooking, 59% of respondents indicated the need for care in handling cooked rice, an area neither widely known nor given perhaps enough coverage. 33% of respondents did not demonstrate either a negative or a positive response to this question; however only 5% disagreed with the statement and only 1% strongly disagreed. This has been identified as an area the public is lacking in knowledge and should be included in campaigns targeted at temperature control.

11% of respondents believed that it was impossible to get food poisoning from sweets and puddings, which indicates a lack of knowledge of the foods capable of sustaining bacterial growth, and therefore needing care.

When presented with the statement "You can tell if food is safe to eat by its smell", as noted, there was a fairly equal distribution. Whilst smell is an indicator of the freshness of a commodity it can not be used to determine the bacterial content. This indicates a lack of understanding of spoilage and pathogenic bacteria.

The statement "Whilst recovering from a stomach upset it is likely I would not prepare food" again had a fairly even split, with slightly more indicating a positive attitude. The responses in general highlighted the need for the public to be made aware that even when symptoms of food poisoning have subsided the organism can still be transmitted, indicating the need to refrain from the preparation of food or to practice strict personal hygiene. This has been demonstrated in the responses to Q.4 and 17, and may not be an area of undue concern for the environmental health department.

When questioned about the preparation of food in advance contributing to food poisoning, the responses were very disappointing with only 39% of respondents identifying the practice as a contributory factor to food poisoning, an area already identified in several previous studies (Bryan 1978, Roberts 1982). 3% of the respondents did not feel that preparing food in advance contributed in any way to food poisoning.

The statement "Serving food rare or undercooked is undesirable" generally elicited a similar response to that of Q16, which also addressed the importance of thorough cooking of food to avoid food poisoning.

In the second part of the survey the five main areas that the majority of respondents would use as a source of food safety information are as follows:

1. Cookery books – 58 (91%), already identified as an underutilized source of information.
2. Talks by EHOs – 58 (91%), normally targeted at particular groups, but can be expanded to other areas of the general public.
3. Food manufacturers – 58 (91%), already identified as an area and targeted as part of the Foodlink initiative.
4. Packaging – 57 (89%), an area identified as reaching the whole of the community.
5. Government – 56 (88%), an area not perhaps fulfilling its true potential.

The areas identified by respondents as being the least likely that they would go to for food safety information are as follows:

1. Videos – 39 (61%), obviously not a good source for transmitting the food safety message.
2. Displays – 41 (64%), long thought of as the way to target the public, but obviously not taken notice of as much as professionals believe.
3. School – 44 (69%), again thought of as a way of imprinting lasting information into the minds of tomorrows adults, though not regarded as such by the general public.
4. Home – 47 (73%), again an area that is thought of as conducive to the learning of good hygiene habits, though obviously not regarded as such by the general public.

5. Parents – 48 (75%) , one would have thought the food preparers of tomorrow could have learnt most of their good hygiene habits from their parents, though parents do not seem to believe this to be the case.
6. Newspapers – 48 (75%), an area that one could use to target a vast audience; the general public however do not seem to regard this as being the case.

6.8. Conclusion

Generally the respondents demonstrated a positive attitude towards food safety. The highest score was 166 (a male aged 30 – 34) and the lowest 126 (a female aged 25 – 29), out of a possible 190. There was no significant difference in attitude to food hygiene between male and female respondents, younger and older respondents, or those respondents with and without formal food hygiene training.

The conclusions drawn from the results of this survey can be compared with the findings of previous surveys of a similar nature.

The Omnibus surveys carried out between 1991 and 1994 found that government interventions in the form of health education programmes in the wake of the salmonella scares had an effect on improving the attitude of the general public to food hygiene practices (OPCS 1995). This compares favourably with the findings of this study in that respondents had a more positive attitude to those areas of food safety that had received high profile media coverage.

However the discrepancies between attitude and behaviour as illustrated by the Foodlink 1994 survey and by Albrechts' survey of 1995, (both of which found that although consumers may be aware of good hygiene practices, they do not necessarily put them into practice), may also be valid in this survey. Even though respondents have demonstrated a positive attitude in their replies to the questionnaire, this does

not necessarily mean that they put these practices into operation in their own kitchens.

The information gained in this study together with that of the studies discussed in chapters 3 and 5 will be used to formulate a health promotion strategy for the local authority and this will be addressed in Chapter 7.

Chapter 7

Discussion and Recommendations

7. DISCUSSION AND RECOMMENDATIONS

7.1. Introduction

This chapter brings together the results of the surveys undertaken as part of this study and discussed in previous chapters. It looks at what has been learnt from these surveys and the implications of the results. This information will be used to develop a strategy for local authorities in respect of health education programmes for domestic food handlers in their area. It also identifies the way forward for future projects and areas for future research.

7.2. Background

Surveys indicate that a high proportion of food poisoning occurring in Europe and North America is acquired in the home (Todd 1983, Evans et al 1998). Epidemiological data suggests that certain practices contribute more frequently to the causation of general outbreaks of food poisoning than others. These include inadequate temperature control, cross contamination, preparing food too far in advance, inadequate cleaning techniques and infected food handlers (Roberts 1982, Ryan et al 1996). There is therefore a need to identify food poisoning hazards in the home and direct resources accordingly if we are to reduce the number of food poisoning cases attributable to the home.

To minimise the risk of food poisoning occurring in the home we need to change the practices of the domestic food handler; to do this we must assess if they have the necessary knowledge, beliefs and attitude towards good food hygiene. Knowledge, beliefs and attitudes influence behaviour (Becker et al 1972, Anderson 1988, Daltroy et al 1993), as well as social issues (Engell et al 1986, Zimmerman and Connor 1989). We also know that there may also be a difference between what people know and what they do (Foster and Kaferstein 1985, Griffith and Worsfold 1994).

Surveys of the knowledge, beliefs and attitudes of the subjects of this study (residents of the Borough of Port Talbot) was therefore undertaken, and these have been discussed in chapters 3, 5 and 6. These surveys identified the information the public would require in order to improve their food hygiene practices. We also need to determine the best method of providing the public with this information. A survey into the role of the mass media was undertaken and this was discussed in chapter 4. The aim now being to identify key elements and key messages and to highlight ways in which these can be delivered in a manner that is receptive to the consumer.

7.3. Implications of Results

This study has concentrated on food hygiene in the domestic environment and in particular on four main areas knowledge, beliefs, attitudes and the role of the mass media. The information gained and its implications are discussed below.

7.3.1. Knowledge

The survey discussed in chapter 3 was carried out to identify the extent of, and possible lack of, knowledge of food hygiene held by residents of Port Talbot, so that the local authority's limited resources could be best directed at those areas where they would have greatest impact, i.e. to define the nature of the health education message. The results of the survey highlighted several areas where the respondents' knowledge of good food hygiene practice was lacking. These are:

- The role of the consumer in preventing food poisoning – of the 16% of respondents who had experienced a stomach upset in the previous 6 months, only 8% thought it was caused by food poisoning. Of these 100% thought shellfish to be the cause and that had been consumed at a friend/relative's house. Again only 9% of respondents thought that food prepared in their own home could be responsible for food poisoning.

- The high risk foods that can be involved in outbreaks of food poisoning - only 6% of respondents thought that home made soup/gravy could be a source of food poisoning, and only 11% thought stew. Both of which are high risk, although nationally the number of general outbreaks attributable to meat products in 1995 was 32 (18%). However 33% of respondents blamed canned fish, possibly due to the previous connection with botulism.
- The correct use of microwaves - of the 64% that used a microwave, 20% did not know its power, and 13% never left food to stand for the recommended time after cooking in the microwave oven.
- The correct way to thaw frozen foods - only 14% of respondents thawed frozen chicken in the refrigerator whereas 80% thawed it at room temperature.
- The need for extra care when preparing meals in advance - 52% of respondents prepare meals in advance. Of these 51% stored the meals at ambient temperature.
- The need for the refrigerated transport of food home after shopping - only 1% of respondents always carry chilled food and only 5% always carry frozen foods home in an insulated container.
- The correct use of refrigerators - only 30% of respondents had ever measured the temperature of the refrigerator. 44% didn't know the correct range for their refrigerator and only 19% always adjust the temperature. Only 67% always cover food in the refrigerator, only 36% always put raw meat at the bottom with 63% putting food wherever there is space.

The common causes of food poisoning identified by respondents was very much in line with those identified in previous studies i.e. inadequate thawing, cross contamination, undercooking, poor personal hygiene, inadequate temperature

control, leaving food uncovered, contamination after cooking and pests (Bryan 1978, Roberts 1982, Ryan et al 1996).

If respondents possess an element of good food hygiene knowledge they may present an "illusion of control" (Frewer et al 1994) however as noted above they may not put this knowledge into practice in their own kitchen (Worsfold and Griffith 1997).

The following table lists the subjects identified in the survey as being an area in which the public lacks knowledge, and the key topics of that subject that would need to be included in future health education campaigns.

Table 7.1. Areas of Food Hygiene Knowledge to be addressed in a Health Education Strategy

Subject	Key Topics to be Addressed
Role of the Consumer	Premises that can be involved in food poisoning especially the home. How the consumer can prevent food poisoning in the home.
Foods associated with food poisoning	Foods that are high risk including stews, soups and gravies and the care needed in preparing, cooking and storing them.
Microwaves	The use of microwaves for thawing, cooking and reheating. The need to follow manufacturers instructions including standing times after cooking.
Thawing of frozen foods	The need to completely thaw food under refrigerated conditions. Precautions to be taken when thawing foods to avoid cross contamination.
Preparing foods in advance	The need for thorough cooking, quick cooling and refrigerated storage until use.
Transportation of food after shopping	The need to carry chilled and frozen food home in insulated containers.
Refrigerators	The correct way to store food in the refrigerator to avoid cross contamination. The correct temperature for the refrigerator and the need to check this frequently.

Risk is greater when contamination factors are combined with lack of knowledge about food hygiene and poor levels of cleaning. For example, where householders also have low perception of risk, they believe that they are not susceptible to food poisoning and they think that there is little to be gained in improving hygiene. In addition, where there is an illusion of control no amount of additional knowledge will lead to a change of behaviour (Frewer et al 1994).

If we are therefore to succeed in bringing about a change in behaviour, the provision of knowledge alone will not be enough: it must be part of a far wider strategy, which will also encompass change in beliefs and attitudes.

7.3.2. Beliefs

Chapter 5 looked at the beliefs of the residents of Port Talbot. In order to assess existing beliefs, residents were asked to list the six most important things that they felt that they could do to make the food that they prepared safe to eat. Thirty-two different items were mentioned.

Several of these were in line with good food hygiene practices; however areas were identified in the study which the respondents didn't appear to feel they could control but which were in fact very much within their control in their kitchen. These could be targeted in health promotion campaigns and include:

a) Thawing of food – only 14% of the respondents believed thawing of food to be something they could do to make food safe to eat, although this is an area over which the consumer has full control in the home.

b) Factors relating to the preparation of food in advance - several factors were included in the responses; however whereas 48% identified cooking thoroughly and 45% identified storing correctly, only 10% identified cooling correctly, 5% keeping food hot, 4% not storing food for too long and 1% discarding leftovers.

c) The correct use of refrigerators - only 13% of respondents identified storing raw and cooked foods separately as something they could control in their kitchens, and only 23% thought operating the fridge/freezer correctly to be something they could do to keep food safe.

d) Cross contamination - several factors involved in the process of cross contamination were identified by respondents; however only 4% thought changing dishcloths regularly and 11% using colour coded equipment to be within their control. In contrast to this, 74% identified washing their hands, 66% having cleans surfaces and 47% having clean utensils, as being within their control to keep food safe in their kitchens.

e) Personal hygiene - this again was an area over which surprisingly few respondents felt they had control. 14% listed personal hygiene, 4% listed the covering of cuts, 10% listed not using fingers, 3% the use of disposable gloves, 9% the use of protective clothing, 7% not smoking in the kitchen, 5% not coughing or sneezing over food and only 1% not wearing jewellery.

As can be noted less than half of the respondents felt that they could make food safe by thorough cooking (probably the most controllable area in the home). Temperature control again is identified as an area that respondents appeared to believe they had no control over. This may be because they do not understand the relationship between temperature control and safe food, or because they have a lack of knowledge of the effects of differing temperatures. This is an area which could easily be addressed in promotional campaigns.

The separation of raw and cooked food whilst being fairly high on the list was only recognised by 46 respondents. This is surprising as following the outbreak of

E coli 0157 in Scotland late in 1996, much publicity was given to the need for separation between raw and cooked foods. Perhaps the general public feels this only applies to businesses and cannot equally be practiced in the home.

The following table lists the subjects over which the public have control in their kitchen in ensuring food is safe to eat, but which were identified in the survey as areas over which few respondents believed they had control. It also identifies the key topics of that subject that would need to be included in future health education campaigns.

Table 7.2. Areas Relating to Food Hygiene Beliefs to be Addressed in Health Promotion Campaigns

Subject	Key Topics to be Addressed
Thawing of frozen foods	Frozen Foods can be thoroughly defrosted in the home – the use of refrigerators or cold areas of the home for thawing.
Preparing foods in advance	The need for thorough cooking, then keeping the food hot or quick cooling, in a cold area of the home, and refrigerated storage.
Refrigerators	The consumer can control the growth of bacteria in the home by the correct use of refrigerators.
Personal hygiene	Good personal hygiene in the home affects the safety of the food prepared e.g. use of tongs, not wearing jewellery, wearing overalls, covering cuts with waterproof dressings, not coughing or sneezing over food.
Cross contamination	Changing dishcloths regularly, keeping raw and cooked foods separate, the use of colour coded equipment and keeping everything clean will minimise the risk of food poisoning.

The consumer can easily undertake all the key areas highlighted in the table above. When addressed in future health education campaigns there is a need to ensure the inclusion of how these can be achieved in the home environment.

7.3.3. Attitudes

Chapter 6 looked at the attitudes of residents of Port Talbot to food safety. Generally the results of the survey demonstrated a positive attitude; however certain areas were highlighted which will require targeting by environmental health professionals in order to bring about a change in attitude and therefore behaviour.

Whilst the respondents generally had a positive attitude towards food hygiene, the findings of this part of the study largely mirrored those already found in chapters 3 and 5 – knowledge and beliefs.

No significant differences in attitude were found between male and female respondents. Neither was there any noted difference between younger and older respondents nor between those who had or had not received formal food hygiene training. However, several areas were highlighted where attitudes to good food hygiene could be improved. These include:

- The role of the consumer – only 20% of respondents acknowledged that food poisoning can occur in the home, whilst 86% expressed satisfaction at being able to prepare food hygienically and 88% felt they had control over hygiene when preparing food in the home. However only 69% felt they had the facilities to practice good hygiene in the home.
- Practices carried out in the home – 97% of respondents appreciated that care is needed when preparing food in order to prevent food poisoning; however only 25% acknowledged the need for good personal hygiene when handling cooked foods as being more critical than in handling raw foods.

- Cross contamination – whilst between 72% and 91% acknowledged the importance of cross contamination in preventing food poisoning only 44% felt it important to clean work surfaces with a germicide after using eggs.
- Cooking – whilst respondents had a positive attitude to the need for thorough cooking only 11% had reservations about serving lightly cooked eggs and only 39% acknowledged preparing food in advance contributes to food poisoning.
- Temperature control respondents demonstrated a positive attitude to the need for temperature control in respect of defrosting and cooking; however only 30% acknowledged the need to cool food quickly after cooking.

The following table lists the subjects identified in the survey as being those in which the respondents did not demonstrate a positive attitude and the key topics of that subject that would need to be included in future health education campaigns.

Table 7.3. Areas relating to Attitudes to be addressed in Health Promotion Campaigns

Subject	Key Topics to be Addressed
Role of the consumer	That food poisoning can occur in the home and that it can be prevented by the consumer. The need for good personal hygiene in the kitchen.
Foods associated with food poisoning	Foods that are high risk and the care needed in preparing, cooking and storing them.
Cross contamination	The need to clean worksurfaces with a germicide after preparing raw food including eggs. The need for different worksurfaces and utensils for raw and cooked food. The use of disposable paper towels.
Cooking	The need for thorough cooking.
Preparing foods in advance	The need for thorough cooking, quick cooling and refrigerated storage until use.

Comparisons were drawn with previous studies undertaken in this field albeit that these are few (OPCS 1998, Foodlink 1994, Albrecht 1995). Similarities were noted with these studies; however the demonstration of a positive attitude to food safety is not necessarily an indication that that attitude is translated into appropriate behaviour. It would appear from the results that the provision of information alone is not enough to bring about a change in behaviour (although a very important element): this must be borne in mind in developing a strategy. Also, the way in which information is presented is of the utmost importance (Ackerley 1994).

Chapter 6 also looked at where the respondents would expect to receive food hygiene information. The results of this part of the study proved interesting, in that they were not always the areas thought to be good providers of information by the professional. The top five being cookery books, talks by EHOs, food manufacturers, packaging and the government. This has highlighted the need for a rethink on how campaigns are run and how information is conveyed to the recipient to be best assimilated into their day to day activities.

7.3.4. The Use of the Mass Media

The study of the mass media undertaken in chapter 4 demonstrated that the mass media is an underutilized source of information for the public. It can also be extremely useful in motivating people to change their behaviour by providing them with regular information and cues to action. The use of the mass media can be very successful in communicating health information and therefore in formulating beliefs and changing attitudes towards food safety.

The audience that the mass media reaches covers all areas and levels of the general public, television having the largest potential to achieve this. We also tend to imitate the behaviour of significant others and what we perceive as being normal behaviour

(Jones and Weimer 1977). It was noted in chapter 4 that whilst elements of the mass media are keen to report food safety scares, their covering of food safety education seems to be minimal if not totally ignored. However the highlighting of food scares does in itself draw these issues to the publics attention and may be used as cues to action. Cookery books, magazine articles, recipes and television food programmes, all identified by respondents as places they would go to for food hygiene information, must be encouraged to modify their content to advocate and enforce the food safety message. Campaigns such as the Foodlink initiative can be utilized to achieve this. The powers behind Foodlink, i.e. the Food and Drink Federation and the Chartered Institute of Environmental Health, must therefore be lobbied to bring pressure on the mass media to reinforce the message of such campaigns.

The mass media have a role to play in food safety education, not currently being fulfilled. The recommendations of chapter 4 would fill this gap at a relatively low cost.

It has become evident during the course of this study that there is a plethora of information available to the public on food safety. Whether this information is reaching the necessary quarter however is in doubt. This is an area that could be addressed by local authorities who have a more intimate knowledge of their residents. Radio and television broadcasters can also be persuaded to produce health promoting programmes at their own expense with technical advice from EHOs. This is an excellent way of reaching a mass audience and could be pursued; however it requires the building up of a relationship between the EHO and the broadcaster before cooperation is achieved and the need for continuing commitment from the EHO.

7.4. Comparison of Results of Surveys Undertaken as part of this Study

If we now bring together and compare the results of all the surveys undertaken as part of this study and discussed in previous chapters and above, we note several similarities in the areas identified as those where the respondents were lacking in knowledge, belief or attitude. The table below lists the surveys completed in this project and identifies the areas which need to be included in future health education campaigns.

Table 7.4. Comparison of Results of Surveys

Subject Area	Knowledge Survey	Beliefs Survey	Attitude Survey
Role of the consumer	Food poisoning can occur in the home and how it can be prevented.	Not included.	Food poisoning can occur in the home and how it can be prevented.
Foods associated with food poisoning	High risk foods and the care needed in handling them.		High risk foods and the care needed in handling them.
Microwaves	Correct use of microwaves.		
Thawing of frozen foods	Correct thawing of frozen foods.	Correct thawing of frozen foods.	
Preparing foods in advance	Correct cooking, cooling and storage.	Correct cooking, cooling & storage.	Correct cooking, cooling & storage.
Cooking			Thorough cooking.
Transporting food after shopping	The need for insulated containers.		
Refrigerators	Correct use & temperature of refrigerators.	Correct use of refrigerators.	
Personal hygiene		Good personal hygiene in the kitchen.	Good personal hygiene in the kitchen.
Cross contamination		Correct cleaning. Use of separate utensils for raw and cooked foods. Keep raw and cooked foods separate.	Correct cleaning. Use of separate utensils for raw and cooked foods. Keep raw and cooked foods separate.

Having identified those areas which need to be included in future health education campaigns it is now necessary to decide how is the best way to get this information across to the general public in a way that they can understand and assimilate it and also put it into practice in their own homes. Both the knowledge survey and the attitude survey included sections, which asked respondents where they would go to obtain information. The following table lists the top ten places identified.

Table 7.5. Places Respondents would go for or thought should provide Food Hygiene Information

Knowledge Survey		Attitude Survey	
Environmental health department	81%	Cookery books	91%
Doctor/health centre	58%	Talks by EHOs	91%
Health promotion unit	58%	Food manufacturers	91%
Supermarket	48%	Packaging	89%
Newspapers/magazines	46%	Government	88%
Cookery books	42%	Food retailers	83%
Library	38%	Local council	83%
School/college	26%	Television	81%
Friends/relatives	19%	Recipes	81%
None of these/don't know	4%	Magazines	80%

Again common areas are noted namely environmental health/local council, supermarket/food retailers, magazines and cookery books, although there are differences in where people would go to obtain information and who they think should provide that information. This highlights that places where promotional events have been organized in the past may not be the best placed to provide that information to the public.

This will need to be borne in mind when planning health education campaigns as it will obviously be more cost effective for local authorities to provide information in places the public are more likely to frequent and where they will be receptive to that information. Consumers may feel there is nothing they can do to slow down the upward trend of food poisoning statistics. They may also feel that they are being

singled out by the government as causing the illness in an attempt to push the blame away from the food industry. These views must be understood and addressed in any consumer awareness programme. Consumers must be made aware of their own power to reduce risk (Frewer et al 1994)

Knowledge alone will not lead to a change in behaviour, other factors must be taken into consideration (Ackerley 1994). However lack of knowledge and misconceptions must be addressed if we are to have any effect on future food poisoning statistics.

7.5. The Way Forward

Having assessed the information gained from this research, there is now a need to determine how this can be used to effect changes in behaviour and practices in the home. The areas of information that have been identified above can now be targeted for health education purposes via the providers identified i.e. local authority or national campaigns which involve EHOs, aimed at getting particular messages across to the public or targeting certain areas of the population; involvement of food manufacturers/retailers to get the message across to the general public and use of the mass media.

7.5.1. Health Education

The concept of health education has already been addressed in Chapter 2. All environmental health departments of local authorities are actively involved in health education in some form or other; however each authority works in isolation, not sharing its knowledge with other authorities. This would appear to be a waste of valuable resources. A strategy for promoting good food hygiene amongst domestic food handlers, which could be utilized by all local authorities, would be an appropriate way forward. The development of such a strategy will be examined later.

7.5.2. Food Hygiene Training

The provision of food hygiene courses for adults and/or the incorporation of basic food hygiene training into the national curriculum may also be a way of getting information to the general public. Food hygiene qualifications are offered by a number of agencies in the UK although all are targeted at food industry employees with course content related to the workplace. However much of the education is conducted away from the working environment and could just as easily be applied to the domestic situation.

There is however a lack of evidence of improved food hygiene practices resulting directly from training programmes although post course assessments demonstrate improvements in knowledge levels (Tebbutt 1992, Worsfold 1993). Before funds are channelled into food hygiene training for the domestic food handler, it is therefore essential that the effect of existing training be analysed.

7.6. Recommendations for a Strategy

Given the increase in the reported incidence of food poisoning and the indications that this will continue to increase, local authorities need to look at implementing food poisoning prevention strategies.

The surveillance function yields data, which enables those involved in the control of food poisoning to prioritize their activities. While general statistical information on food poisoning indicates the extent of the problem, only detail from investigations can provide information on why and how outbreaks occur (Bryan et al 1987). It is this information that is essential to determining the significance of particular hazards and in devising strategies for health education. The surveys carried out in chapters 3 - knowledge, 4 - sources of knowledge, 5 - beliefs and 6 - attitudes have provided us with information necessary to formulate a strategy for the local authority.

7.6.1. Areas to be Included in a Strategy

Based on the findings of the surveys undertaken and discussed earlier the following areas are identified for inclusion in a strategy:

1. The development of knowledge and skills to enable the public to make informed responsible choices about food safety. Subjects that should be included are:
    a. Role of the consumer – the consumer needs to be aware that they have a role to play in the provision of safe food, that food poisoning can and does occur in the home and what they can do to prevent it occurring. This could be achieved by use of a calamity kitchen display showing various food safety hazards. The hazards could include amongst others:
        i. cooked and raw food on a chopping board
        ii. flies on cooked ham at room temperature
        iii. dirty cleaning cloths
        iv. hamster cage on worksurface next to food
        v. dirty nappy on worksurface next to baby's bottle
    b. Food associated with food poisoning – this could be achieved by use of a display of different foods in a local shopping mall, and a competition asking the public to identify which are high risk and would require additional care in preparing, cooking etc. Leaflets could also be distributed to the public.
    c. Microwaves – to demonstrate the correct use of microwaves for thawing, cooking and reheating of foods a display could be held in a local shopping mall, utilizing microwaves loaned by local retailers. This could incorporate a competition for the public and could again be backed up by leaflets, which could be taken home by the public for later perusal.

d. Thawing of frozen foods – this would best be achieved by the distribution of leaflets at the checkout of local shops especially those selling frozen foods which would inform the public of correct thawing times and procedures.

e. Preparing foods in advance – leaflets could be designed and distributed to the public informing them that if food has to be prepared in advance the precautions they need to take to ensure the food is thoroughly cooked, quickly cooled and correctly stored under refrigerated conditions.

f. Transportation of food home after shopping – local retailers of frozen foods should be encouraged to provide insulated containers for the public to carry their chilled and frozen food purchases home. The public could be encouraged to use these containers by the distribution of leaflets at the checkout.

g. Refrigerators – exhibitions and displays could be held at local shopping centres concentrating on the correct method of storage for perishable and high risk foods. Local businesses could be encouraged to loan refrigerators and food which would be used to demonstrate correct use of the refrigerator. Posters and leaflets can be used to endorse the message and free fridge thermometers distributed to the public. Involvement of local radio stations should also be encouraged as they can distribute the message to a wider audience and may also sponsor events.

h. Personal hygiene – this could also be incorporated into the calamity kitchen by use of the following in addition to those listed in :

   i. dirty overall on the worksurface

   ii. smoking/ashtray on the worksurface

   iii. jewellery and/or makeup in the kitchen

iv. used non waterproof plaster on the worksurface

Personal hygiene can also be addressed by posters and via the distribution of leaflets and encouraging handwashing in schools etc.

i. Cross contamination – this is another area that can be included in the calamity kitchen by use of the following in addition to those listed in a. above:

   i. cat food bowl mixed with washing up
   ii. spilt food – rat in the kitchen
   iii. cat and cat litter tray in the kitchen
   iv. overflowing bins/flies
   v. dirty tea towels

   Information on how to avoid cross contamination could be distributed at the display and the local press could be encouraged to attend and disseminate the information via their newspapers etc.

j. Cooking – the need for thorough cooking of foods can be addressed by the distribution of leaflets, listing cooking times, at the checkouts of local stores. This is especially applicable at the Christmas season when large turkeys etc. are purchased. The issue of cooking can also be included in displays and exhibitions and via competitions.

Evaluation of all initiatives should be undertaken in order to assess its viability for future use. It is also advisable to undertake promotional campaigns in line with national events such as the National Food Week which is organized on an annual basis: material from this can then be used locally and the local campaign gains from the national media coverage.

Campaigns must be seasonal and varied so as to maintain the interest of the public.

2. The development of personal skills which promote good food hygiene, possibly through educational establishments and/or specific groups e.g. WI
3. The increase of awareness of the causes of food poisoning and safe food handling techniques by:
    a. The delivery of talks to groups in the community such as local church groups cookery clubs etc.
    b. The publication of articles in the local press relating to food hygiene. This can be achieved by the publication of details of locally run campaigns both before and during the event.
    c. The use of local radio to publicize information on campaigns and generally on food hygiene.
    d. The distribution of leaflets on food hygiene to the general public by having a regular stand at such places as shopping centres, libraries, leisure centres and health centres.

7.7 Conclusions

Based on the findings of this study the following conclusions are reached:

1. The general public underestimates the potential for food poisoning in the home. There is a need for further research into food hygiene practices carried out in the home environment.
2. Food preparation in the home presents a variety of hazards - more care is therefore needed in the handling of high-risk foods particularly those produced by newer technologies e.g. microwaves.
3. Most people understand the need for correct cooking. However food is commonly cooked in advance and the need to understand cooling procedures and correct storage is essential.

4. Domestic food handlers would benefit from greater awareness of correct food hygiene practices.

7.8. Recommendations for improving Food Hygiene Practices in the Home

The following recommendations are made as to how the consumer can improve food hygiene practices in the home:

1. When shopping food should be purchased just prior to returning home. The public should be encouraged to do this by provision of information via leaflets or via a display set up in the local foodstores.
2. Food should be put in the boot of the car where it will be cooler and less likely to be warmed up by direct sunlight. Again this information can be provided to the customer when they make their purchases by means of posters and leaflets at the store.
3. Insulated bags should be used to carry chilled and frozen foods home. These should be provided at all food stores selling chilled or frozen foods.
4. Perishables should be unloaded immediately on returning home and stored correctly in the refrigerator. The consumer can gain this information from displays and leaflets provided at the store.
5. The temperature of the refrigerator should be checked with a specific refrigerator thermometer. These can be issued to the general public at exhibitions and displays, by the food store and could also be included in the purchase of a new refrigerator.
6. Worksurfaces and chopping boards should be disinfected with a suitable sanitiser before using to prepare food. The public can be encouraged in this practice by means of displays, posters and leaflets at shopping centres where they purchase both food and cleaning materials.

7. Hands should be washed and dried thoroughly before touching food: a practice to be encouraged by means of posters, displays and the provision of leaflets
8. Chopping boards and utensils for raw and cooked foods should be kept separately and colour coded. Again these can be purchased at local shopping centres and posters, displays and leaflets will draw the public's attention to the need for these in avoiding cross contamination.
9. Disposable dishcloths and towels should be used. If this is not possible then ensure they are clean and disinfected before use. The provision of cheap, readily accessible, disposable cloths at local supermarkets etc should be encouraged and displays, posters and leaflets will draw the public's attention to their use in avoiding cross contamination.
10. Frozen meat should be thawed thoroughly in the refrigerator. This can be addressed by means of a display in a local shopping centre as indicated above.
11. Food should be cooked thoroughly and core temperatures checked with a probe thermometer. The need for thorough cooking can be addressed by the provision of leaflets with every purchase of food at supermarkets etc. The provision of suitable probe thermometers, for use by the public, should also be encouraged.
12. Food should be cooled quickly after cooking and stored refrigerated. This again can be targeted by means of displays at local food stores, shopping centres etc. and followed up by the provision of leaflets.
13. Manufacturers' instructions should be followed when preparing food. In displays, demonstrations and exhibitions held the public must be informed of the necessity to follow manufacturers' instructions. This can also be endorsed by the provision of leaflets etc.

Other agencies such as industry, retailers, the media and government also have a role to play in preventing food poisoning. The following actions are recommended for these agencies:

Industry

1. Food Safety messages should be included on packaging of food. This could only be achieved nationally by involvement of professional bodies such as the Chartered Institute of Environmental Health and the government.
2. Cooking times and temperatures and storage instructions should be included on packaging. Again this is best achieved on a national scale.
3. Cheap digital thermometers should be available for home use. Local stores can be encouraged to provide these. Multi-national companies can be approached by the home authority.
4. Compact rapid chillers should be available for home use. Again this may not be achievable at local level, but local authorities can lobby government.
5. Built-in thermometers should be provided for refrigerators and freezers in the home. This is best addressed at national level by professional bodies which can lobby government to assist in such provision.
6. Bactericidal soaps should be available for the home kitchen. These are currently available, the use of which must be encouraged locally via campaigns and also nationally via the manufacturers.

Retailers

1. Check-out staff should pack chilled and frozen foods separately and separate from other goods.
2. Retailers should provide insulated bags for customers to transport chilled and frozen food home.

3. Chilled and frozen foods should be located in the store near to the checkouts to minimise the length of time in the shopping trolley at ambient temperature.
4. More information on food safety should be provided in the store by means of regular displays, posters and the provision of leaflets.

The Media

1. Cookery programmes should include food hygiene practices. Approaches to producers of such programmes could be achieved both locally and nationally.
2. The press should be encouraged to provide positive food safety information.
3. Food safety information should be included in recipes.
4. Magazines should publish regular articles on food safety.

Government

1. The raising of awareness of food safety issues for domestic food handlers to encourage them to put good food hygiene practices into operation in their kitchens.
2. The provision of education for current domestic food handlers and for the next generation. This education must include:
    a. correct thawing
    b. correct cooking
    c. correct cooling
    d. temperature control
    e. avoidance of cross contamination
    f. personal hygiene
3. The encouragement and promotion of food safety campaigns aimed at the domestic food handler.

The local authority as a corporate body can also play a vital role in assisting and promoting the above. This would include:

1. Approaching local manufacturers to encourage the provision of food safety information on their labels and packaging.
2. Encouraging directors of education to include food hygiene training as part of the core curriculum.
3. Organizing exhibitions and displays as already identified which would address the various areas of concern.
4. Providing leaflets to the general public to endorse information given by EHOs, and at exhibitions.
5. Approaching producers of television programmes and editors of cookbooks and magazines to encourage the inclusion of food safety information in their merchandise.
6. Approaching government via professional bodies to encourage a proactive approach to food safety with a higher profile being given to initiatives.
7. Establishing a sound working relationship with the local press to encourage the regular inclusion of articles relating to food safety.

The concept of health education is both positive and empowering, it is also a useful tool and politically attractive. Consideration must be given to the recommended principles, subject areas and priorities. By so doing future activities in the health education field can be planned, implemented and evaluated more successfully. Further development work is clearly needed and this will be an ongoing task of local authorities and central government.

7.9. Areas of Further Work

Whilst the survey has achieved its original aims and objectives, in so doing it has identified parts of the study which could have been undertaken differently, areas which require additional work and also topics for further research. These include:

1. The numbers of respondents to each survey undertaken was not consistent due to the problems encountered in attempting to replicate the original knowledge survey. In future studies consideration should be given to conducting the surveys at shopping malls or as part of a campaign.
2. There is a need to undertake a survey of all local authorities in the Principality to assess their existing health promotion strategies in respect of food safety. Are there lessons to be learnt from these and could they be utilized to formulate an all Wales strategy.
3. A survey of all local authorities should also be undertaken to assess what food hygiene education is being provided for the public.
4. Further research should be undertaken into the potential for food poisoning and food hygiene practices in the home, in particular storage, re-heating and cleaning. This could be by means of a questionnaire but would probably be more valid if carried out by means of hazard analyses in the respondents' home.
5. Where notifications of food poisoning are received by the local authority a hazard analysis of the home could be undertaken when investigating the case if it was felt that the case of food poisoning was attributable to the home.
6. Repeat all the surveys carried out with larger groups of the community and in other areas of the country.
7. Form alliances with industry by means of the Home Authority principle to encourage manufactures to provide food hygiene messages on packaging, bactericidal soap for domestic kitchen use and LCD thermometers for home use.

8. Approach national supermarkets and encourage them to provide more food hygiene information in store by means of displays, which EHOs could attend, posters and leaflets.
9. Work with the media to provide positive food hygiene information which can be distributed to larger audiences
10. Implement community initiatives to encourage good food hygiene practices in the home by working with groups such as young mothers.
11. Encourage schools to provide basic food hygiene courses by approaching local directors of education and working with teachers.
12. Undertake several health promotion campaigns locally, in line with those indicated above, and carry out evaluations of same in order to assess their impact and future viability.
13. Set up local health promotion groups, which will include members of other disciplines, e.g. public health doctors, health visitors, community dieticians, who can bring additional information to the group and work together to collaborate on campaigns undertaken locally.

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Appendix 1

Knowledge Survey

Raw Data

1a. How often do you eat or buy food in your work/school canteen?

Every day	19.0%
2-3 times/week	11.9%
Once a week	3.6%
2-3 time/month	3.6%
Once a month	0.0%
Less often	1.2%
Never	60.7%
Missing cases = 0	

b. How often do you eat or buy food in a pub?

Every day	1.2%
2-3 time/week	1.2%
Once a week	4.9%
2-3 time/month	8.5%
Once a month	11.0%
Less Often	35.4%
Never	37.8%
Missing cases = 2	

c. How often do you eat or buy food from a hotel restaurant?

2-3 time/week	0.0%
Once a week	0.0%
2-3 time/month	1.2%
Once a month	4.9%
Less often	23.2%
Never	36.6%
Missing cases = 2	

d. How often do you eat or buy food from a restaurant?

2-3 times/week	3.7%
Once a week	7.4%
2-3 times/month	13.6%
Once a month	17.3%
Less often	43.2%
Never	14.8%
Missing cases = 3	

e. How often do you eat or buy food from a takeaway restaurant?

Every day	1.2%
2-3 times/week	1.2%
Once a week	14.8%
2-3 times/month	16.0%
Once a month	8.6%
Less often	23.5%
Never	34.6%
Missing cases = 3	

f. How often do you eat or buy food from a café/sandwich/snack bar?

2-3 times/week	6.1%
Once a week	13.4%
2-3 times/month	9.8%
Once a month	9.8%
Less often	23.2%
Never	31.7%
Missing cases = 2	

2. How often on average do you go shopping for food?

Every day	0.0%
2-3 times/week	22.6 %
Once a week	73.8%
2-3 times/month	1.2%
Once a month	2.4%
Less often	0.0%
Missing cases = 0	

3a. When you are buying food how often do you look at the use by/best before date?

Always	84.5%
Sometimes	13.1%
Never	2.4%
Don't know	0.0%
Missing cases = 0	

b When you are buying food how often do you look at the condition of the packaging?

Always	79.5%
Sometimes	15.7%
Never	4.8%
Don't know	0.0%
Missing cases = 1	

c. When you are buying food how often do you look at the storage instructions?

Always	27.7%
Sometimes	55.4%
Never	16.9%
Don't know	0.0%
Missing cases = 1	

4a. Do you ever buy chilled and/or frozen products?

Yes - chilled	1.2%
Yes - frozen	17.9%
Yes - both	77.4%
No - neither	3.6%
Don't know	0.0%
Missing cases = 0	

b. Do you ever carry the chilled goods home from the shop in an insulated container?

Always	1.4%
Sometimes	23.2%
Never	75.4%
Don't know	0.0%
Missing cases = 15	

Do you ever carry the frozen goods home in an insulated container?

Always	5.0%
Sometimes	17.5%
Never	77.5 %
Don't know	0.0%
Missing cases = 4	

c. How much time normally passes before the chilled/frozen food Is taken home and put into your fridge/freezer?

Less than 1 hour	75.6%
1-2 hours	19.5%
2-5 hours	4.9%
5-12 hours	0.0%
Don't know/varies	0.0%
Don't have fridge/freezer	0.0%
Missing cases = 0	

5a. Do you ever prepare or cook frozen chicken?

Yes	78.3%
No	21.7%
Missing cases = 1	

For respondents answering Yes to Qu.5a.

b. In which of the following places do you normally thaw the frozen chicken?

Fridge	13.6%
Kitchen	72.7%
Utility Room	7.6%
Garage	0.0%
Microwave	4.5%
Other	1.5%
Missing cases = 18	

c. Which of the following methods do you usually use to defrost it?

Leave to defrost slowly at room/fridge temperature	90.9%
Leave in cold water	3.0%
Leave in warm water	0.0%
Microwave oven	6.1%
Conventional oven	0.0%
Other	0.0%
Missing cases = 18	

d. For approximately how long would you thaw a 3lb frozen chicken?

Less than 2 hours	4.7%
2-5 hours	6.3%
5-12 hours	40.6%
12-18 hours	25.0%
18-24 hours	9.4%
24 hours +	12.5%
Microwave time given	0.0%
Don't know	1.6%
Missing cases = 20	

e. How long would you cook a 3lb frozen chicken for once it had thawed?

Up to 1 hour	0.0%
1hour - 1hour 30 mins	13.4%
1 hour 30 mins - 2 hours	38.8%
2 hours - 2 hours 30 mins	32.8%
Over 2 hours 30 mins	11.9%
Microwave time given	0.0%
Don't know	3.0%
Missing cases = 17	

6a. Do you ever cook fresh chicken?

Yes	75.9%
No	24.1%
Don't know	0.0%
Missing cases = 1	

For respondents answering yes to Qu. 6a

b. For how long would you cook a 3lb fresh chicken?

Up to 1 hour	0.0%
1hour - 1hour 30 mins	14.1%
1 hour 30 mins - 2 hours	37.5%
2 hours - 2 hours 30 mins	32.8%
Over 2 hours 30 mins	10.9%
Don't know	4.7%
Missing cases = 20	

7a Have you ever measured the temperature of your fridge?

Yes	29.8%
No	67.9%
Don't know	2.4%
Missing cases = 0	

b. Within which of the following temperature ranges should your fridge be at?

2° C - +2° C	28.6%
+2° C - +6° C	27.4%
+6° C - +10° C	2.4%
Don't know	41.7%
Missing cases = 0	

8a I cover all food in my fridge

Always	66.7%
Sometimes	23.8%
Never	9.5%
Don't know	0.0%
Missing cases = 0	

b. I wrap all raw meat or put it on a plate

Always	85.7%
Sometimes	7.1%
Never	6.9%
Don't know	1.2%
Missing cases = 0	

c. I put food anywhere in the fridge where there is space

Always	34.6%
Sometimes	28.4%
Never	37.0%
Don't know	0.0%
Missing cases = 3	

d. I adjust the temperature of my fridge

Always	19.0%
Sometimes	42.9%
Never	36.9%
Don't know	1.2%
Missing cases = 0	

e. I store raw meat in the bottom of the fridge

Always	35.7%
Sometimes	32.1%
Never	29.8%
Don't know	2.4%
Missing cases = 0	

9a How often on average do you eat chilled ready meals?

Every day	0.0%
2-3 times/week	11.3%
Once a week	18.8%
2-3 times/month	7.5%
Once a month	11.3%
Less often	11.3%
Never	40.0%
Missing cases = 4	

b. How often on average do you eat frozen ready meals?

Every day	3.8%
2-3 times/week	10.0%
Once a week	31.3%
2-3 times/month	5.0%
Once a month	5.0%
Less often	15.0%
Never	30.0%
Missing cases = 4	

c. How often on average do you eat home cooked meals

Every day	73.8%
2-3 times/week	20.2%
Once a week	2.4%
2-3 times/month	1.2%
Once a month	0.0%
Less often	1.2%
Missing cases = 0	

d. How often on average do you eat home cooked desserts?

Every day	11.0%
2-3 times/week	26.8%
Once a week	12.2%
2-3 times/month	15.9%
Once a month	7.3%
Less often	12.2%
Never	14.6%
Missing cases = 2	

e. How often on average do you eat vegetarian meals?

Every day	7.5%
2-3 times/week	6.3%
Once a week	1.3%
2-3 times/month	7.5%
Once a month	6.3%
Less often	15.0%
Never	56.3%
Missing cases = 4	

f. How often on average do you eat shop bought sandwiches?

Every day	6.0%
2-3 times/week	4.8%
Once a week	2.4%
2-3 times/month	6.0%
Once a month	3.6%
Less often	13.3%
Never	63.9%
Missing cases = 1	

g. How often on average do you eat home made sandwiches?

Every day	23.8%
2-3 times/week	39.3%
Once a week	19.0%
2-3 times/month	8.3%
Once a month	1.2%
Less often	2.4%
Never	6.0%
Missing cases = 0	

h. How often on average do you eat shellfish?

Every day	0.0%
2-3 times/week	0.0%
Once a week	4.9%
2-3 times/month	9.8%
Once a month	11.0%
Less often	13.4%
Never	61.0%
Missing cases = 2	

10a. Do you ever prepare meals in advance, either for eating later that day or on another day?

Yes - to be eaten later the same day	15.7%
Yes - to be eaten on another day	7.2%
Yes - both	28.9%
No	45.8%
Don't know	2.4%
Missing cases = 1	

For respondents answering Yes to Qu. 10a

In which of the following places do you store cooked meals, which are not to be eaten immediately? (More than one answer could be given)

Fridge	71.1%
Freezer	35.6%
Microwave	17.8%
Oven	15.6%
Grill compartment of cooker	4.4%
Saucepan on top of cooker	22.2%
Worksurface, covered	28.9%
Worksurface, uncovered	0.0%
Don't store, just keep hot	2.2%
Missing cases = 39	

c. In which way do you normally reheat these meals?

Conventional oven	18.2%
Grill	0.0%
Microwave oven	63.6%
In saucepan on the hob	15.9%
Over saucepan using steam	0.0%
None - do not reheat	2.3%
Don't know	0.0%
Missing cases = 40	

11. By which of the following means, if any, do you decide of food is fit to eat? (more than one answer could be given)

Look at the use by/best before date	92.9%
Look for mould	69.0%
Count days since purchase	52.4%
Smell the food	76.2%
Look at foods condition	88.1%
Taste the food	13.1%
Feel the food	52.4%
Other methods	0.0%
No method used	0.0%
Don't know	0.0%
Missing cases = 0	

12a Do you ever use a microwave oven?

Yes	64.3%
No	35.7%
Missing cases = 0	

For respondents answering Yes to Qu. 12a

b. What do you use the microwave oven for? (More than one answer could be given)

Defrosting chicken	27.8%
Defrosting joints of meat	27.8%
Defrosting other foods	64.8%
Reheating chilled ready meals	42.6%
Reheating frozen ready meals	46.3%
Reheating other food items	64.8%
Cooking chicken	9.3%
Cooking joints of meat	11.1%
Cooking other food items	48.1%
Missing cases = 30	

c. Do you know the power of your microwave?

650 watts	53.7%
600 watts	16.7%
550 watts	0.0%
Other	9.3%
Don't know	20.4%
Missing cases = 30	

d. Do you leave food cooked/reheated/defrosted in the microwave to stand for the recommended time?

Yes - always	53.7%
Yes sometimes	33.3%
No	13.0%
Don't know	0.0%
Missing cases = 30	

13a Have you personally had any sort of stomach upset in the last 6 months?

Yes - diarrhoea	4.8%
Yes - vomiting	3.6%
Yes diarrhoea and vomiting	7.2%
No	81.9%
Don't know	2.4%
Missing cases = 1	

For respondents answering Yes to Qu. 13a

b. Did any other member of you household suffer the same symptoms as you?

Yes	30.8%
No	69.2%
Don't know	0.0%
Missing cases = 71	

c. Did you report the illness to your Doctor?

Yes	23.1%
No	76.9%
Don't know	0.0%
Missing cases – 71	

d. What do you think caused this stomach upset?

Food poisoning/something eaten	7.7%
Allergy	0.0%
Bug/Virus/Germ	46.2%
Nerves/Shock	7.7%
Morning sickness/pregnancy	7.7%
Alcohol/hangover	23.1%
Other	7.7%
Don't know/can't remember	0.0%
Missing cases = 71	

For respondents answering "food poisoning" to Qu. 13d

14a What food do you think was responsible?

Ready made meal - frozen	0.0%
Ready made meal - chilled	0.0%
Poultry	0.0%
Beef	0.0%
Pork	0.0%
Meat pie/pastie	0.0%
Shell fish	100.0%
Other	0.0%
Don't know	0.0%
Missing cases = 83	

b. Where did you eat or buy the suspect food?

Supermarket	0.0%
Sandwich/Snack bar	0.0%
Work/School canteen	0.0%
Friend/Relative's home	100.0%
Hotel/Pub	0.0%
Restaurant	0.0%
Takeaway	0.0%
Other	0.0%
Don't know/can't remember	0.0%
Missing cases = 83	

15. Did you report your illness to the Environmental Health Department?

Yes	0.0%
No	100.0%
Missing cases = 0	

16. Which of the following foods do you think are common sources of food poisoning?. (more than on answer could be given)

Ready made meals - frozen	32.1%
Ready made meals - chilled	69.0%
Stew	10.7%
Home made soup/gravy	6.0%
Poultry	90.5%
Beef	21.4%
Pork	51.2%
Lamb	25.0%
Meat pie/pasties	70.2%
Milk	19.0%
Eggs	60.7%
Other dairy products	31.0%
Shell fish	82.1%
Canned fish	33.3%
Vegetables	6.0%
Cakes/pastrys	11.9%
Don't know	1.2%
Missing cases = 0	

17a. Where do you think most food responsible for food poisoning is prepared?

Supermarket	5.7%
Sandwich/snack bar	18.6%
Work/school canteen	0.0%
Friend's/relative's home	1.4%
Own home	8.6%
Hotel	0.0%
Pub	2.9%
Restaurant	2.9% see b
Takeaway	50.0% see c
Other	0.0%
Don't know	10.0%
Missing cases = 14	

b. What sort of restaurant?

Indian	100.0%
Chinese	0.0%
American/burger	0.0%
Steak house	0.0%
Other	0.0%
Missing cases = 82	

c. What sort of takeaway?

Indian	44.1%
Chinese	32.4%
Kebab	17.6%
Pizza	0.0%
Burger	2.9%
Fish and Chips	0.0%
Other	2.9%
Missing cases = 50	

18. Which of the following do you think are common causes of food poisoning?

More than one cause could be given

Keeping food for a long time	94.0%
Microwave cooking	30.1%
Flies	94.0%
Reheating food	80.7%
Canned food	9.6%
Poor handwashing	80.7%
Slow cookers	18.1%
Inadequate thawing of frozen food	90.4%
Contamination cooked food with raw	88.0%
Animals/birds	69.9%
Leaving food uncovered	74.7%
Thawing then refreezing	80.7%
Mice/rats	79.5%
Contamination of food after cooking	68.7%
Keeping food at room temp	68.7%
Insects/cockroaches	81.9%
Undercooking of food	89.2%
Missing cases = 1	

19a. Do you take any precautions against food poisoning?

Yes	81.9%
No	8.4%
Don't know	9.6%
Missing cases = 1	

20. Which of the following do think cause food poisoning?

	Respondents agreeing
Yeast	8.4%
Viruses	68.7%
Metals	20.5%
Bacteria	91.6%
Clostridia	31.3%
Toxins	72.3%
Campylobacter	20.5%
Mould	75.9%
Staphylococcus	50.6%
Salmonella	95.2%
Botulism	80.7%
Chemicals	44.6%
Listeria	91.6%
None of the above	0.0%
Don't know	1.2%
Missing cases = 1	

21a. Can food be made safe against food poisoning?

Yes	85.7%
No	6.0%
Don't know	8.3%
Missing cases = 0	

For respondents answering Yes to Qu. 21a

b. In which of the following ways can food be made safe? (more than one method could be given)

	Respondents agreeing
Heating it	80.8%
Freezing it	65.8%
Chilling it	28.8%
Microwaving it	21.9%
Other	5.5%
Missing cases = 11	

22. Do you think there is enough information available regarding food safety and hygiene?

Yes	36.9%
No	57.1%
Don't know	6.0%
Missing cases = 0	

23. Which of these places would you go to get information on food safety and hygiene? (more than one place could be indicated)

	"Yes" responses
Library	38.1%
Environmental Health Dept	81.0%
Supermarket	48.8%
Doctor/Health Centre	58.3%
School/College	26.2%
Health Promotion Unit	58.3%
Newspapers/Magazines	46.4%
Cookery books	42.9%
Friends/relatives	19.0%
None of these/don't know	3.6%

Missing cases = 0

GENERAL INFORMATION

24. Sex of respondent

Male	25.0%
Female	75.0%
Missing cases = 0	

25. Age group

16 - 24	10.7%
25 - 34	11.9%
35 - 44	29.8%
45 - 54	25.0%
55 - 64	8.3%
65 +	14.3%
Missing cases = 0	

26. Marital Status

Single	9.5%
Married/living together	71.4%
Separated/divorced	6.0%
Widowed	13.1%
Missing cases = 0	

27. Working status

Working full time	40.5%
Working part time	16.7%
Student	6.0%
Retired	19.0%
Unemployed	17.9%
Missing cases = 0	

28. Are there any children in the household under the age of 12?

Yes	27.7%
No	72.3%
Missing cases = 1	

29. Which of the following appliances do you use in your kitchen?

	Yes responses
Microwave	63.1%
Fridge	66.3%
Fridge-freezer	59.0%
Freezer	55.4%
Slow cooker	13.3%
Pressure cooker	39.8%
Cooker	98.8%
Missing cases = 0	

APPENDIX 2

NEWSPAPER CHECKLIST

Name of Newspaper

Date of Issue

	Yes	No	Not Applicable
1. Were food safety issues addressed at all in the newspaper?			

Degree of Information

[ ] Comprehensive [ ] Adequate [ ] Brief

2. Were healthy eating issues addressed at all in the newspaper?

Degree of Information

[ ] Comprehensive [ ] Adequate [ ] Brief

3. Were food poisoning outbreaks reported in the newspaper?

4. Were food scares reported in the newspaper?

5. If so were preventative measures addressed?

6. Was the importance of thorough cooking addressed?

7. Was the importance of refrigerated storage addressed?

8. Was there any mention of good hygiene practices?

APPENDIX 3

LEAFLET CHECKLIST

Name of Leaflet

Where obtained

	Yes	No
Was the leaflet easy to obtain by members of the public?		
Was the information contained well presented?		
Was the information easy to read?		
Was the information contained easy to understand?		
Did the leaflet contain any jargon?		
Was the leaflet non-technical?		
Was the leaflet item specific?		

APPENDIX 4

MAGAZINE CHECKLIST

Name of Magazine

Date of Issue

	Yes	No	Not Applicable

1. Were food safety issues addressed at all in the magazine?

Degree of Information

[ ] Comprehensive [ ] Adequate [ ] Brief

2. Were nutritional healthy-eating issues addressed at all in the magazine?

[ ] Comprehensive [ ] Adequate [ ] Brief

3. Was the importance of thorough cooking addressed?

4. Was the importance of refrigerated storage addressed?

5. Was there any mention of good hygiene practices?

APPENDIX 5

BOOK CHECKLIST

Name of Book

Author

Date of Application

Yes No

1. Is there any information contained in the book on food safety?

Degree of information

[ ] Comprehensive [ ] Adequate [ ] Brief

2. Is there any information in the book on nutritional healthy eating?

Degree of information

[ ] Comprehensive [ ] Adequate [ ] Brief

3. Was there any information contained in the recipes on food hygiene?

4. Was there any information contained in the recipes on the importance of refrigerated storage?

5. Was there any information contained in the recipes on the importance of refrigerated storage after cooking if not to be immediately consumed?

6. Was there any information in the book on food poisoning?

7. Was there any information in the book on bacteria?

APPENDIX 6

HYGIENE AUDIT OF TELEVISION COOKERY DEMONSTRATIONS

Programme Dish Demonstrated

What are the hazards and risks associated with ingredients used, during preparation, cooking and serving?

Time of Demonstration Type of facilities available

Topics mentioned: Food safety( ) Healthy Eating( ) Nutritional value( )

Marking: Y N NA

Storage

1. Does the chef show or mention high-risk foods stored under refrigeration?

Preparation

2. Does the chef show or mention handwashing at the beginning?
3. Does the chef show or mention handwashing at appropriate points in the demonstration?
4. Does the chef wear protective clothing?
5. Does the programme show separation of foods to minimise risk of cross contamination?
6. Does the chef show or mention hygienic handling of food e.g. minimum handling, washing?
7. Does the chef show good hand and personal habits?
8. If applicable, does the chef mention the need for correct thawing of ingredients?
9. Does the chef show hygienic use of equipment and containers e.g. knives, chopping boards, cloths, paper?
10. Is there visible evidence of appropriate cleaning materials e.g. sanitiser?

Cooking

11. Are cooking methods appropriate for the dish demonstrated?
12. If appropriate, are cooking times, temperature and shelf position given?
13. Is the need for adequate cooking mentioned?
14. Visual assessment of correct cooking
15. Is tasting of food carried out hygienically?
16. Are tests for adequate cooking mentioned or demonstrated?

Post Cooking

17. Is the need for proper cooling mentioned?
18. Is the necessity for refrigeration mentioned or demonstrated?
19. Is the method of cooling mentioned or demonstrated?
20. If dish is eaten cold, is protection from contamination mentioned or demonstrated?
21. Is information or guidance provided on safe re-heating?
22. If dish is served in the demonstration, is correct handling shown?

APPENDIX 7

FINAL STUDY - FOOD AND THE CONSUMER

We are carrying out a survey on behalf of Port Talbot Borough Council into Food Hygiene in the home. Would you express your views about the following statements by ticking the appropriate box.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
I have more important things to think about than food hygiene					
I find instructions on the label useful in preparing food					
Food poisoning rarely if ever occurs in the home					
Hot soapy water is important in hand washing					
Consumers frequently have to prepare food in a hurry					
Good food hygiene will prevent food poisoning					
Making sure food is safe to eat needs hygiene education					
Preparing food hygienically gives me satisfaction					
My friends feel that food hygiene is unimportant					
I usually do not use the same worksurfaces for raw and cooked food					
Consumers generally do not have the facilities for good hygiene					
I have very little control over hygiene in food preparation					
Disposable paper towels are more hygienic than dishcloths in the kitchen					
I generally do not use the same utensils for handling raw and cooked food					
The responsibility for food hygiene lies with the person who sells the food					
Cooking food properly prevents food poisoning					
I intend to wash my hands before handling cooked foods in future					
It is impossible to get food poisoning from sweets or pudding					
After preparing sandwiches I will probably keep them in an ordinary lunchbox					
My family feels that food hygiene is important					

Hands may contaminate food during its preparation					
You can tell if food is safe to eat by its smell					
After using eggs I will not clean work areas with a germicide					
I tend to keep leftovers covered and on a kitchen worksurface until needed					
Whilst recovering from a stomach upset it is likely I would not prepare food					
Large items of food need to be defrosted properly before cooking					
Next time I cool food after cooking I will probably do it quickly					
Re-heating of cooked or previously prepared foods is of minor importance in food safety					
Storing cooked food at room temperatures in the kitchen is difficult to avoid					
Preparation of food in advance is likely to contribute significantly to food poisoning					
Cleaning work surfaces before preparing food protects the food from contamination					
Serving food rare or undercooked is undesirable					
Personal hygiene is more critical in handling cooked than raw foods					
Preventing contamination of foods in the kitchen requires care					
Cooked food coming into contact with raw food can cause food poisoning					
Particular care will be needed the next time I keep rice after cooking					
Handling poultry with care is important					
The responsibility for food hygiene information should lie with the local council					
I have no reservations about serving lightly cooked eggs					
Television chefs could be good role models for food hygiene					
Cookbooks/recipes are potentially useful sources for food safety information					
No special care is required in cooking food at barbecues					

SECTION 2

Would you use food hygiene information provided by the following.

Please tick yes or no to each question.

	Yes	No
School		
Home		
Parents		
Food Retailers		
Local Council		
Government		
Television		
Newspapers		
Cookery Books		
Magazines		
Displays		
Talks by Environmental Health Officer		
Packaging		
Leaflets		
Videos		
Recipes		
Food Manufacturers		

Please list which five of the above do you think are the most important?

Occupation of Primary Wage Earner.....

Gender: M ☐ F ☐

Age:.....please tick

15-19

20-24

25-29

30-34

35-39

40-44

45-49

50-54

55-59

60-64

65-69

70 or over

Do you frequently prepare food in your home? Yes ☐ No ☐

Have you received any formal food hygiene training? Yes ☐ No ☐

If yes, please give details

APPENDIX 8

FULL TABLE OF RESULTS

Field1	Q1	Q2	Q3	Q4	Q6	Q7	Q8	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17
R1	5	5	5	4	5	2	5	5	2	4	4	4	1	5	4
R2	5	4	4	4	4	0	4	3	4	4	4	3	2	4	4
R3	4	4	4	5	5	2	4	3	4	4	4	4	2	4	4
R4	4	5	2	5	4	1	5	2	2	5	5	4	5	5	5
R5	3	2	1	4	4	2	3	5	3	1	5	4	3	5	5
R6	3	4	1	5	5	2	3	5	3	1	5	5	4	5	5
R7	5	5	2	5	2	2	3	5	5	5	4	5	4	5	5
R8	5	5	5	5	5	1	1	4	4	4	5	5	4	5	4
R9	4	5	4	4	5	1	4	5	1	5	2	5	1	5	4
R10	5	3	5	5	4	4	4	5	1	1	4	5	4	5	5
R11	5	4	5	5	3	5	5	5	5	5	3	5	5	1	5
R12	4	4	2	4	5	2	3	4	5	4	4	4	4	4	4
R13	5	5	5	5	5	1	5	5	5	5	5	5	1	4	5
R14	4	4	4	5	5	2	5	5	4	5	4	4	2	1	4
R15	5	4	4	4	4	2	4	4	4	4	4	4	4	4	4
R16	4	4	4	4	5	2	4	5	4	4	4	4	2	4	5
R17	5	4	4	5	4	2	4	5	4	4	4	5	2	4	5
R18	5	5	1	5	5	3	5	3	4	5	4	3	5	5	3
R19	4	2	2	4	4	2	4	2	4	4	2	2	3	4	4
R20	5	1	1	5	0	1	5	5	4	5	5	3	5	4	5
R21	5	4	4	4	4	2	4	4	5	5	4	4	5	4	1
R22	4	4	5	5	5	1	4	5	5	5	5	2	5	5	5
R23	4	5	3	4	5	1	4	3	3	4	5	2	3	5	3
R24	4	4	4	4	5	1	5	4	4	4	5	4	3	4	5
R25	2	4	3	4	2	2	4	4	4	4	5	4	3	4	5
R26	4	4	4	5	4	2	4	4	4	4	4	4	2	4	4
R27	2	3	4	2	4	3	4	2	4	4	4	4	4	4	4
R28	4	4	4	4	4	2	4	4	4	4	4	2	4	4	4
R29	2	4	3	4	4	3	4	3	3	2	4	2	3	5	3
R30	5	4	1	5	5	2	4	4	4	5	5	4	4	4	4
R31	4	3	4	5	4	2	5	5	5	5	4	4	5	5	1
R32	5	4	5	4	4	2	4	4	4	5	4	4	2	4	4
R33	4	4	5	4	5	1	5	4	2	5	5	5	1	5	5
R34	4	4	3	4	5	1	5	5	5	4	5	4	1	5	5
R35	4	4	5	4	5	1	5	4	2	5	5	5	1	5	5
R36	3	4	4	4	4	2	3	4	4	4	4	4	4	4	4
R37	4	4	5	5	5	1	5	4	2	5	5	5	1	5	5
R38	3	5	5	5	5	2	4	4	4	4	4	4	4	4	4
R39	4	5	4	4	4	0	5	5	4	4	4	5	3	3	5
R40	4	5	3	5	5	1	5	5	4	4	5	5	2	5	5
R41	5	4	4	4	4	2	4	2	4	4	5	4	5	4	4
R42	3	4	4	4	5	2	4	2	3	3	4	2	4	5	3
R43	4	4	3	4	5	1	4	5	3	5	5	5	2	4	5
R44	4	3	4	4	5	1	4	4	3	4	5	4	1	5	4

R45	4	4	3	5	4	2	4	4	4	4	5	4	1	4	5
R46	4	4	4	5	4	1	3	4	5	4	5	2	3	4	0
R47	3	5	3	5	4	2	4	2	4	4	4	2	3	4	4
R48	4	4	3	5	5	1	4	4	3	5	4	4	2	4	4
R49	4	5	5	5	3	2	4	5	5	5	5	5	5	3	3
R50	5	5	5	3	5	2	4	5	4	5	4	4	4	4	4
R51	4	5	3	4	4	3	4	4	2	4	3	4	4	4	5
R52	3	4	2	5	5	1	5	5	3	4	3	4	1	5	5
R53	4	4	5	5	4	2	4	5	4	5	4	5	4	2	5
R54	4	4	5	5	4	2	4	4	5	4	4	4	4	2	4
R55	5	4	2	5	5	2	5	4	4	5	5	5	2	5	5
R56	5	5	1	5	5	2	3	5	5	5	5	4	2	5	5
R57	5	4	3	5	5	2	5	5	4	1	5	5	5	3	5
R58	2	4	4	2	5	1	3	5	4	5	5	5	5	3	5
R59	5	4	4	5	5	3	4	3	4	5	4	5	4	4	5
R60	5	4	5	5	5	2	5	4	4	4	4	4	2	4	3
R61	5	4	4	4	5	1	5	4	4	3	3	3	3	3	3
R62	5	4	3	5	5	2	5	4	3	4	5	4	1	5	4
R63	3	4	1	4	4	2	4	4	3	3	3	5	4	4	4
R64	5	4	4	4	5	3	4	4	3	4	4	4	2	4	5
	264	261	227	284	281	115	266	263	238	264	274	257	196	265	269

Q18	Q19	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34
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4	4	4	2	2	4	4	5	2	4	2	2	2	4	2	4
242	207	280	200	209	277	223	292	182	266	248	198	248	261	174	274

Q35	Q36	Q37	Q39	Q40	Q41	Q42	TOTAL	Occupation	M/F	Age Group	Prepare Food	Food Hygiene Training
3	3	5	5	5	5	5	149	Speech Therapist	F	6	YES	NO
4	3	4	4	4	4	4	137	Collier	M	4	YES	NO
4	4	4	4	5	5	4	144	Factory Worker	F	5	YES	NO
5	4	5	5	5	4	5	149	Electrician	M	6	YES	NO
4	4	5	3	5	5	5	140	Milkman	M	4	YES	NO
5	4	5	3	5	5	5	149	Milk Retailer	F	7	YES	NO
4	3	5	4	4	4	5	150	Local Government Officer	F	7	YES	NO
4	4	4	4	5	5	4	148	Factory Worker	F	10	YES	NO
5	3	5	4	4	4	5	147	Steel Worker	M	4	YES	NO
5	4	5	5	4	3	5	158	Local Government	F	4	YES	NO
1	4	4	3	3	2	5	152	Unemployed	M	5	YES	NO
3	3	4	2	3	4	4	141	Manager	F	8	YES	NO
5	5	5	5	5	5	5	158	Clerk	F	3	YES	NO
4	3	5	4	5	5	5	153	Craftsman	M	9	YES	NO
4	2	4	4	4	4	4	139	Retired	F	12	YES	NO
4	3	4	4	4	4	4	143	Fitter & Turner	M	9	YES	NO
4	3	4	4	4	4	4	146	Fitter & Turner	F	8	YES	NO
5	5	5	3	1	3	5	150	Unemployed	M	7	YES	NO
4	4	4	4	5	4	4	133	Bank Clerk	F	3	YES	NO
5	0	5	0	5	3	5	137	Bank Clerk	F	4	YES	NO
4	3	5	4	4	4	5	147	Manager	F	8	YES	NO
5	5	5	5	5	5	5	157	Teacher	F	7	YES	NO
3	3	5	5	4	5	5	148	Fitter	M	2	YES	NO
5	4	5	0	3	4	4	140	Fitter/Turner	M	4	YES	NO
5	4	5	3	4	5	5	157	Project Co-ordinator	F	5	YES	NO
4	4	4	2	5	4	4	136	Staff Nurse	F	4	YES	NO
4	3	4	3	4	4	4	133	Steel Worker	F	4	YES	NO
4	3	4	3	4	4	4	135	Retired	F	9	YES	NO
4	3	4	3	5	4	4	131	Insurance	F	3	YES	NO

								Officer				
5	4	4	4	4	4	4	148	Accountant	F	5	YES	NO
5	4	5	5	4	4	5	153	Nurse	M	5	YES	NO
4	4	4	2	4	3	4	139	Retired	F	9	YES	YES
1	5	5	5	5	5	5	165	Env Health Officer	M	7	YES	YES
4	3	5	3	3	5	4	141	Machine Operator	M	7	YES	NO
1	5	5	5	5	5	5	165	Lorry Driver	M	5	YES	NO
4	4	4	5	4	4	4	141	Fitter/Turner	M	5	YES	NO
1	5	5	5	5	5	5	166	Steel Worker	M	4	YES	NO
4	3	4	1	4	4	5	142	Typist	F	5	YES	NO
4	0	5	3	5	5	5	144	Retired	F	10	YES	NO
5	5	5	5	4	2	5	165	University Lecturer	F	8	YES	NO
4	3	4	3	4	4	3	141	Local Govt Officer	M	3	YES	YES
5	3	4	3	4	4	4	132	Self Employed	F	4	YES	YES
5	4	5	3	5	2	5	156	Contracts Manager	M	5	YES	YES
5	3	5	4	4	4	2	133	Chemist/inspector	M	8	YES	NO
4	2	4	2	5	4	3	142	Accountant	F	5	YES	NO
4	4	5	3	5	3	5	145	Health Visitor	F	4	YES	NO
4	4	4	2	4	4	3	126	Civil Servant	F	3	YES	NO
4	3	4	4	4	4	3	135	Process Operator	M	5	YES	NO
5	3	5	1	3	4	4	142	Labourer/HGV Driver	M	4	YES	NO
4	5	5	3	5	4	5	155	Nurse	F	5	YES	NO
5	5	4	3	4	4	1	131	Student	F	1	YES	YES
5	5	5	4	4	4	4	146	Computer Operator	M	8	YES	NO
5	4	4	4	4	4	4	146	Steel Worker	F	5	YES	NO
4	3	4	4	4	4	5	142	Steelworker	M	6	YES	NO
5	5	5	5	2	4	5	151	Administrator	F	8	YES	YES
4	5	5	4	4	3	5	152	Paint Technician	M	8	YES	NO
4	4	4	3	5	4	5	153	Manager	M	5	YES	YES
5	5	5	5	4	2	5	165	Housewife	F	12	YES	NO
4	4	5	3	3	3	5	149	Teacher	M	7	YES	NO
4	4	4	4	3	3	4	142	Dental Technician	M	8	YES	YES
5	4	5	3	5	4	5	142	Carpenter	F	10	YES	YES

1	1	5	4	1	3	5	143	Retired	F	12	YES	NO
4	4	4	3	4	5	5	134	Bank Clerk	F	3	YES	NO
4	4	4	4	3	4	4	137	Secretary	F	8	YES	NO
261	233	291	226	263	255	282	9316					

Appendix 9

Overall score for each respondent

Respondent Number	Total Score
1	149
2	137
3	144
4	149
5	140
6	149
7	150
8	148
9	147
10	158
11	152
12	141
13	158
14	153
15	139
16	143
17	146
18	150
19	133
20	137
21	147
22	157
23	148
24	140
25	157
26	136
27	133
28	135
29	131
30	148
31	153
32	139
33	165
34	141
35	165
36	141
37	166
38	142
39	144
40	165
41	141
42	132
43	156
44	133
45	142
46	145
47	126
48	135
49	142

50	155
51	131
52	146
53	146
54	142
55	151
56	152
57	153
58	165
59	149
60	142
61	142
62	143
63	134
64	137

Appendix 10

Overall score per question

Question Number	Total Score
1	264
2	261
3	227
4	284
5	Not scored
6	281
7	115
8	266
9	Not scored
10	263
11	238
12	264
13	274
14	257
15	196
16	265
17	269
18	242
19	207
20	Not scored
21	280
22	200
23	209
24	277
25	223
26	292
27	182
28	266
29	248
30	198
31	248
32	261
33	174
34	274
35	261
36	233
37	291
38	Not scored
39	226
40	263
41	255
42	282

Appendix 11

Full Table of Results

Section 1

Q.1 I have more important things to think about than food hygiene

Score	No of Respondents
1	0
2	4
3	8
4	28
5	24

Q.2 I find instructions on the label useful in preparing food

Score	No of Respondents
1	1
2	2
3	4
4	41
5	16

Q.3 Food Poisoning rarely if ever occurs in the home

Score	No of Respondents
1	7
2	6
3	12
4	23
5	16

Q.4 Hot Soapy Water is important for handwashing

Score	No of Respondents
1	0
2	2
3	1
4	28
5	33

Q.5 Consumers frequently have to prepare food in a hurry

Not scored

Q.6 Good food hygiene will prevent food poisoning

Score	No of Respondents
1	0
2	2
3	2
4	24
5	35

Q.7 Making sure food is safe to eat needs hygiene education

Score	No of Respondents
1	1
2	1
3	6
4	34
5	20

Q.8 Preparing food hygienically gives me satisfaction

Score	No of Respondents
1	1
2	0
3	8
4	34
5	21

Q.9 My friends feel that food hygiene is unimportant

Not scored

Q.10 I usually do not use the same worksurfaces for raw and cooked food

Score	No of Respondents
1	0
2	6
3	6
4	27
5	25

Q.11 Consumers generally do not have the facilities for good hygiene

Score	No of Respondents
1	2
2	6
3	12
4	32
5	12

Q.12 I have very little control over hygiene in food preparation in my home

Score	No of Respondents
1	4
2	1
3	3
4	31
5	25

Q.13 Disposable paper towels are more hygienic than dishcloths in the kitchen

Score	No of Respondents
1	0
2	2
3	5
4	30
5	27

Q.14 I generally do not use the same utensils for handling raw and cooked food

Score	No of Respondents
1	0
2	8
3	4
4	31
5	21

Q.15 The responsibility for food hygiene lies with the person who sells the food

Score	No of Respondents
1	11
2	14
3	10
4	18
5	11

Q.16 Cooking food properly prevents food poisoning

Score	No of Respondents
1	2
2	2
3	5
4	31
5	24

Q.17 I intend to wash my hands before handling cooked foods in future

Score	No of Respondents
1	2
2	0
3	7
4	24
5	30

Q.18 It is impossible to get food poisoning from sweets or pudding

Score	No of Respondents
1	0
2	7
3	12
4	33
5	12

Q.19 After preparing sandwiches I will probably keep them in an ordinary lunchbox

Score	No of Respondents
1	1
2	21
3	7
4	27
5	7

Q.20 My family feels that food hygiene is important

Not scored

Q.21 Hands may contaminate food during its preparation

Score	No of Respondents
1	0
2	1
3	1
4	30
5	31

Q.22 You can tell if food is safe to eat by its smell

Score	No of Respondents
1	6
2	22
3	7
4	16
5	13

Q.23 After using eggs I will not clean the work areas with a germicide

Score	No of Respondents
1	1
2	10
3	23
4	21
5	7

Q.24 I tend to keep leftovers covered and on a kitchen worksurface until needed

Score	No of Respondents
1	0
2	1
3	4
4	32
5	27

Q.25 Whilst recovering from a stomach upset it is likely I would not prepare food

Score	No of Respondents
1	1
2	12
3	10
4	32
5	8

Q.26 Large items of food need to be defrosted properly before cooking

Score	No of Respondents
1	0
2	0
3	1
4	21
5	41

Q.27 Next time I cool food after cooking I will probably do it quickly

Score	No of Respondents
1	8
2	25
3	12
4	7
5	12

Q.28 Re-heating of cooked or previously prepared foods is on minor importance in food safety

Score	No of Respondents
1	4
2	2
3	2
4	28
5	28

Q.29 Storing cooked food at room temperatures in the kitchen is difficult to avoid

Score	No of Respondents
1	1
2	7
3	10
4	27
5	19

Q.30 Preparation of food in advance is likely to contribute significantly to food poisoning

Score	No of Respondents
1	2
2	20
3	17
4	20
5	5

Q.31 Cleaning worksurfaces before preparing food protects the food from contamination

Score	No of Respondents
1	0
2	7
3	11
4	29
5	17

Q.32 Serving food rare or undercooked is undesirable

Score	No of Respondents
1	0
2	2
3	11
4	31
5	20

Q.33 Personal hygiene is more critical in handling cooked than raw foods

Score	No of Respondents
1	7
2	27
3	14
4	9
5	7

Q.34 Preventing contamination of foods in the kitchen requires care

Score	No of Respondents
1	0
2	1
3	1
4	41
5	21

Q.35 Cooked food coming into contact with raw food can cause food poisoning

Score	No of Respondents
1	5
2	0
3	3
4	35
5	23

Q.36 Particular care will be needed the next time I keep rice after cooking

Score	No of Respondents
1	1
2	2
3	21
4	25
5	13

Q.37 Handling poultry with care is important

Score	No of Respondents
1	0
2	0
3	0
4	29
5	35

Q.38 The responsibility for food hygiene information should lie with the local council

Not scored

Q.39 I have no reservations about serving lightly cooked eggs

Score	No of Respondents
1	2
2	5
3	20
4	21
5	14

Q.40 Television chefs could be good role models for food hygiene

Score	No of respondents
1	2
2	1
3	8
4	30
5	23

Q.41 Cookbooks/recipes are potentially useful sources for food safety information

Score	No of Respondents
1	0
2	4
3	9
4	35
5	16

Q.42 No special care is required in cooking food at barbecues

Score	No of Respondents
1	1
2	1
3	4
4	23
5	35

SECTION 2

Section 2 asked respondents to tick the following list as to whether they would use that source as a provider of food hygiene information. The total number of respondents ticking each category is indicated alongside

	Total
School	44
Home	47
Parents	48
Food Retailers	53
Local Council	53
Government	56
Television	52
Newspapers	48
Cookery Books	58
Magazines	51
Displays	41
Talks by Environmental Health Officer	58
Packaging	57
Leaflets	51
Videos	39
Recipes	52
Food Manufacturers	58